NON-BIDDING

PROPOSAL

TRANSPORTATION CABINET
Department of Highways
Frankfort, Kentucky 40622

PROPOSAL NO. _____
PROJECT CODE NO. 03-0001

LETTING OF JANUARY 17, 2003
Sealed Bids will be received in the Division of Contract Procurement and/or the Auditorium located on the 1st Floor of the State Office Building until 10:00 A.M., EST, on JANUARY 17, 2003. Bids will be publicly opened and read at 10:00 A.M., EASTERN STANDARD TIME.

PROJECT IDENTIFICATION AND DESCRIPTION:

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179
The Cincinnati-Lexington Road (I-75) ARTIMIS Expansion from the Walton Exit to Mount Zion Road.

Reference Markers, Overhead Variable Message Signs, Video Cameras and Roadway Weather Information System.

Status Report Item No. 6-974.01.

(6)

GEOGRAPHIC COORDINATES:
LATITUDE - 38° 58' NORTH
LONGITUDE - 84° 45' WEST

COMPLETION DATE ESTABLISHED FOR PROJECT: DECEMBER 31, 2003

LIQUIDATED DAMAGES SEE STANDARD SPECIFICATIONS

REQUIRED BID PROPOSAL GUARANTY: Not less than 5% of the total bid.

(Check guaranty submitted: Cashier's Check |__| Certified Check |__| Bid Bond |__|)

BID BONDS WHEN SUBMITTED WILL BE RETAINED WITH THE PROPOSAL.

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VII	CERTIFICATION AND DBE CERTIFICATION **(SEE BACK PAGE)**	

BID..... |__|
SPECIMEN..... |__|

PROPOSAL ISSUED TO: _____

_____
Address City State Zip

PART I

SCOPE OF WORK

1. Project Detail

a.	See Road Plans	
b.	Special Notes Applicable to Project	Attached
c.	Supplemental Specifications	Attached
d.	Special Notes for Boone County ARTIMIS Expansion	Attached
e.	Special Notes for Utility Clearance	Attached

SPECIAL NOTES APPLICABLE TO PROJECT

2000 SPECIFICATIONS

Any reference in the plans or in the proposal to the ***Standard Specifications for Road and Bridge Construction, Edition of 1998***, and ***Standard Drawings, Edition of 2000*** are superseded by ***Standard Specifications for Road and Bridge Construction, Edition of 2000*** and ***Standard Drawings, Edition of 2003.***

2001 SUPPLEMENTAL SPECIFICATIONS

The ***2001 Supplemental Specifications*** to the 200 Standard Specifications for Road and Bridge Construction shall apply to this project.

The Kentucky Department of Highways, in accordance with the Regulations of the United States Department of Transportation 23 CFR 635.112 (h), hereby notifies all bidders that failure by a bidder to comply with all applicable sections of the 1998 Kentucky Standard Specifications, including, but not limited to the following, may result in a bid not being considered responsive and thus not eligible to be considered for award:

102.02 Current Capacity Rating
102.08 Irregular Proposals
102.09 Proposal Guaranty
102.10 Delivery of Proposals
102.14 Disqualification of Bidders

PROPOSAL ADDENDA

All addenda to this proposal must be incorporated into the proposal when the bid is submitted to the Kentucky Department of Highways. Failure to use the correct and most recent bid sheet(s) may result in the bid being rejected.

BID SUBMITTAL

Bidder must use the Department's Highway Bid Program available on the internet web site of the Department of Highways, Division of Contract Procurement. (www.kytc.state.ky.us/contract)

The Bidder must download the bid items created from the web site to prepare a bid proposal for submission to the Department. The bidder must insert the completed bid item sheets printed from the Program into the bidder's proposal and submit with the disk created by said program.

JOINT VENTURE BIDDING

Joint Venture bidding is permissible. However, both companies MUST purchase a bidding proposal. Either proposal may be submitted but must contain the company names and signatures of both parties where required. A joint bid bond of 5% may be submitted for both companies or each company may submit a separate bond of 5%.

CIVIL RIGHTS ACT OF 1964

The Kentucky Department of Highways, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the Regulations of the Federal Department of Transportation (49 C.F.R., Part 21), issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin.

NOTICE TO ALL BIDDERS

To report bid rigging activities call: 1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

FHWA 1273
The requirements of Paragraph VI of FHWA 1273 does not apply to projects with a total cost of less than $1,000,000.00.

SECOND TIER SUBCONTRACTS
Second Tier subcontracts on federally assisted projects shall be permitted. However, in the case of DBE's, second tier subcontracts will only be permitted where the other subcontractor is also a DBE. All second tier subcontracts shall have the consent of both the Contractor and the Engineer.

The Asphalt Base Price shall be **$170.00 (English)** as applicable in Section 109.07 of the *1998 Standard Specifications.*

NHS PROJECTS
This project is on the ***NATIIONAL HIGHWAY SYSTEM.***

WORK ZONE CATEGORY I AND II DEVICES
The Contractor is required to provide certification that all *Work Zone Category I and II Devices* are compliant with **NCHRP 350** before these devices are used on the project. *Category II Devices* include, but are not limited to: portable sign stands (with signs), type I, II & III barricades, vertical panels, intrusion alarms, cones with lights, and other work zone devices under 45kg (100 lb).

UNDERGROUND FACILITY DAMAGE PROTECTION
The contractor is advised that the Underground Facility Damage Protection Act of 1994, became law January 1, 1995. It is the contractor's responsibility to determine the impact of the act regarding this project, and take all steps necessary to be in compliance with the provision of the act.

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

SPECIAL NOTE
DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

It is the policy of the Kentucky Transportation Cabinet ("the Cabinet") that Disadvantaged Business Enterprises ("DBE") shall have the opportunity to participate in the performance of highway construction projects financed in whole or in part by Federal Funds in order to create a level playing field for all businesses who wish to contract with the Cabinet. To that end, the Cabinet will comply with the regulations found in 49 CFR Part 26, and the definitions and requirements contained therein shall be adopted as if set out verbatim herein.

The Cabinet, contractors, subcontractors, and sub-recipients shall not discriminate on the basis of race, color, national origin, or sex in the performance of work performed pursuant to Cabinet contracts. The contractor shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted highway construction projects. The contractor will include this provision in all its subcontracts and supply agreements pertaining to contracts with the Cabinet.

Failure by the contractor to carry out these requirements is a material breach of its contract with the Cabinet, which may result in the termination of the contract or such other remedy as the Cabinet deems necessary.

OBLIGATION OF CONTRACTORS

Each contractor prequalified to perform work on Cabinet projects shall designate and make known to the Cabinet a liaison officer who is assigned the responsibility of effectively administering and promoting an active program for utilization of DBEs.

If a formal goal has not been designated for the contract, all contractors are encouraged to consider DBEs for subcontract work as well as for the supply of material and services needed to perform this work.

Contractors are encouraged to use the services of banks owned and controlled by minorities and women.

CONTRACT GOAL

CONTRACT GOAL

The Disadvantaged Business Enterprise (DBE) goal established for this contract is 2 % of the total value of the contract.

The contractor shall exercise all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises participate in at least the percent of the contract as set forth above as goals for this contract.

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

CERTIFICATION OF CONTRACT GOAL

Contractors shall include the following certification in bids for projects for which a DBE goal has been established. **BIDS SUBMITTED WHICH DO NOT INCLUDE CERTIFICATION OF DBE PARTICIPATION WILL NOT BE READ PUBLICLY. These bids will not be considered for award by the Cabinet and they will be returned to the bidder.**

"The bidder certifies that it has secured participation by Disadvantaged Business Enterprises ("DBE") in the amount of ____ percent of the total value of this contract and that the DBE participation is in compliance with the requirements of 49 CFR 26 and the policies of the Kentucky Transportation Cabinet pertaining to the DBE Program."

The Certification statement is located on the last page of this proposal. All contractors **must** certify their DBE participation on that page. **DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted.**

DBE PARTICIPATION PLAN

All bidders are **encouraged** to submit their General DBE Participation Plan with their bid on the official form. Lowest responsive bidders whose bid packages include DBE Participation Plans may be awarded the contract at the next Awards Committee meeting provided that the DBE goal is met. The DBE Participation Plan shall include the following:

1) Name and address of DBE Subcontractor(s) and/or supplier(s) intended to be used in the proposed project;

2) Description of the work each is to perform including the work item , unit, quantity, unit price and total amount of the work to be performed by the individual DBE;

3) The dollar value of each proposed DBE subcontract and the percentage of total project contract value this represents. DBE participation may be counted as follows;

a). If DBE suppliers and manufactures assume actual and contractual responsibility, the dollar value of materials to be furnished will be counted toward the goal as follows:

- The entire expenditure paid to a DBE manufacturer;
- 60 percent of expenditures to DBE suppliers that are not manufacturers provided the supplier is a regular dealer in the product involved. A regular dealer must be engaged in, as its principal business and in its own name, the sale of products to the public, maintain an inventory and own and operate distribution equipment; and
- the amount of fees or commissions charged by the DBE firms for a bona fide service, such as professional, technical, consultant, or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials, supplies, delivery of materials and supplies or for furnishing bonds, or insurance, providing such fees or commissions are determined to be reasonable and customary.

b). The dollar value of services provided by DBEs such as quality control testing, equipment repair and maintenance, engineering, staking, etc.;

c). The dollar value of joint ventures. DBE credit for joint ventures will be limited to the dollar amount of the work actually performed by the DBE in the joint venture;

4) Written and signed documentation of the bidder's commitment to use a DBE contractor whose participation is being utilized to meet the DBE goal; and

5) Written and signed confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment.

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

The apparent low bidder who does not submit a General DBE Participation Plan with the bid shall submit it within 10 calendar days after receipt of notification that they are the apparent low bidder. The project will not be considered for award prior to submission and approval of the apparent low bidder's DBE Participation Plan.

Detailed DBE Participation Plan forms will be included in the Contractor Package presented to successful bidders following the awarding of the project. The Detailed DBE Participation Plan must be completed and returned to Contract Procurement in accordance with Cabinet policy. A copy of the blank estimate will be included with the Detailed DBE Participation Plan to list sequence items by PCN (Project Control Number).

Changes to DBE Participation Plans must be approved by the Cabinet. The Cabinet may consider extenuating circumstances including, but not limited to, changes in the nature or scope of the project, the inability or unwillingness of a DBE to perform the work in accordance with the bid, and/or other circumstances beyond the control of the prime contractor.

CONSIDERATION OF GOOD FAITH EFFORTS REQUESTS

If the DBE participation submitted in the bid by the apparent lowest responsive bidder does not meet or exceed the DBE contract goal, the apparent lowest responsive bidder must submit a Good Faith Effort Package to satisfy the Cabinet that sufficient good faith efforts were made to meet the contract goals prior to submission of the bid. **Efforts to increase the goal after bid submission will not be considered in justifying the good faith effort, unless the contractor can show that the proposed DBE was solicited prior to the letting date. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted.** One complete set and nine (9) copies of this information must be received in the office of the Division of Contract Procurement no later than 12:00 noon of the tenth calendar day after receipt of notification that they are the apparent low bidder.

Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Cabinet considers in judging good faith efforts. This documentation may include written subcontractors' quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

The Good Faith Effort Package shall include, but may not be limited to information showing evidence of the following:

1. Whether the bidder attended any pre-bid meetings that were scheduled by the Cabinet to inform DBEs of subcontracting opportunities;

2. Whether the bidder provided solicitations through all reasonable and available means;

3. Whether the bidder provided written notice to all DBEs listed in the DBE directory at the time of the letting who are prequalified in the areas of work that the bidder will be subcontracting;

4. Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainly whether they were interested. If a reasonable amount of DBEs within the targeted districts do not provide an intent to quote or no DBEs are prequalified in the subcontracted areas, the bidder must notify the DBE Liaison in the Office of Minority Affairs to give notification of the bidder's inability to get DBE quotes;

5. Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise perform these work items with its own forces;

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

6. Whether the bidder provided interested DBEs with adequate and timely information about the plans, specifications, and requirements of the contract;

7. Whether the bidder negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached;

8. Whether quotations were received from interested DBE firms but were rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firm's quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy DBE goals;

9. Whether the bidder specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be subcontracted includes potential DBE participation;

10. Whether the bidder made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal; and

11. Any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include DBE participation.

FAILURE TO MEET GOOD FAITH REQUIREMENT

Where the apparent lowest responsive bidder fails to submit sufficient participation by DBE firms to meet the contract goal and upon a determination by the Good Faith Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the bidder will be offered the opportunity to meet in person for administrative reconsideration. The bidder will be notified of the Committee's decision within 24 hours of its decision. The bidder will have 24 hours to request reconsideration of the Committee's decision. The reconsideration meeting will be held within two days of the receipt of a request by the bidder for reconsideration.

The request for reconsideration will be heard by the Office of the Secretary. The bidder will have the opportunity to present written documentation or argument concerning the issue of whether it met the goal or made an adequate good faith effort. The bidder will receive a written decision on the reconsideration explaining the basis for the finding that the bidder did or did not meet the goal or made adequate Good Faith efforts to do so.

The result of the reconsideration process is not administratively appealable to the Cabinet or to the United States Department of Transportation.

The Cabinet reserves the right to award the contract to the next lowest responsive bidder or to rebid the contract in the event that the contract is not awarded to the low bidder as the result of a failure to meet the good faith requirement.

SPECIAL NOTES APPLICABLE TO PROJECT (CONTINUED)

SANCTIONS FOR FAILURE TO MEET DBE REQUIREMENTS OF THE PROJECT

Failure by the prime contractor to fulfill the DBE requirements of a project under contract or to demonstrate good faith efforts to meet the goal constitutes a breach of contract. When this occurs, the Cabinet will hold the prime contractor accountable as would be the case with all other contract provisions. Therefore, the contractor's failure to carry our the DBE contract requirements shall constitute a breach of contract and as such the Cabinet reserves the right to exercise all administrative remedies at its disposal including, but not limited to the following:

- Disallow credit toward the DBE goal;
- Withholding progress payments;
- Withholding payment to the prime in an amount equal to the unmet portion of the contract goal; and/or
- Termination of the contract.

CONTRACTOR REPORTING

All contractors must keep detailed records and provide reports to the Cabinet on their progress in meeting the DBE requirement on any highway contract. These records may include, but shall not be limited to payroll, lease agreements, cancelled payroll checks, executed subcontracting agreements, etc. Prime contractors will be required to submit certified reports on monies paid to each DBE subcontractor or supplier utilized to meet a DBE goal.

Prime contractors will incorporate a requirement into DBE subcontracts, including supply contracts, that DBEs must provide to the Division of Construction, a copy of all checks received from the prime contractor within seven days of receipt of payment for work performed on Cabinet projects. Checks to DBE subcontractors must include the PCN number, estimate number, and the sequence and quantity.

DEFAULT OR DECERTIFICATION OF THE DBE

If the DBE subcontractor or supplier is decertified or defaults in the performance of its work, and the overall goal cannot be credited for the uncompleted work, the prime contractor may utilize a substitute DBE or elect to fulfill the DBE goal with another DBE on a different work item. If after exerting good faith effort in accordance with the Cabinet's Good Faith Effort policies and procedures, the prime contractor is unable to replace the DBE, then the unmet portion of the goal may be waived at the discretion of the Cabinet.

Kentucky Transportation Cabinet
General DBE Participation Plan*

03/25/2002

Letting Date: _____ Project Code Number (PCN) _____ Project Number: _____

Designated DBE Goal % _____

Prime Contractor _____ DBE Company Name _____

Address _____

City, State, Zip _____

Federal Tax ID _____

Type of DBE Work (all applicable)

_____ Supplier _____ Subcontractor _____ Manufacturer _____ Engineering _____ Other _____

Itemized worked to be performed by DBE Company:

Supplier 60% Y/N	Item Number	Description of Participation	Unit of Measure	Quantity to be Performed by DBE	DBE Unit Price **	Dollar Amount (based on DBE

**Note: 60 percent of expenditures to DBE suppliers that are not manufacturers provided the supplier is a regular dealer in the product involved. A regular dealer must be engaged in, as its principal business and in its own name, the sale of products to the public, maintain an inventory and own and operate distribution equipment

Total This DBE _____

Total Bid _____

% Credited toward Goal, this DBE _____

Prime Contractor's Signature: _____ Title: _____ Date: _____

DBE Participant Signature: _____ Title: _____ Date: _____

***This form must be completed for each DBE participant**

Supplemental Specifications to The Standard Specifications for Road and Bridge Construction, 2000 Edition

(Effective with the October 25, 2002 Letting)

Unless stated otherwise, all revisions are to the Standard Specifications for Road and Bridge Construction.

PUBLICATION:	2001 Supplemental Specifications to The Standard Specifications for Road and Bridge Construction.
SUBSECTION:	104.02.02 Overrun and Underrun Formulas.
REVISION:	Void the revision.
SUBSECTION:	104.02.02 Overrun and Underrun Formulas.
REVISION:	Replace the fifth paragraph with the following: For the excessive underrun and overrun quantities, the Department will adjust the payment according to the appropriate following formula:
SUBSECTION:	104.02.02 Overrun and Underrun Formulas.
NUMBER:	3)
REVISION:	Replace the threshold value of 20 percent with 30 percent.
SUBSECTION:	102.07.01 General.
REVISION:	Replace the first sentence with the following: Submit the Bid Proposal on the forms furnished by the Department including the Highway Bid Program bid item sheets and disk created from the Department's internet web site.
SUBSECTION:	102.07.02 Computer Bidding.
REVISION:	Replace the subsection with the following: Subsequent to ordering a Bid Proposal for a specific project, use the Department's Highway Bid Program on the internet web site of the Department of Highways, Division of Contract Procurement. Download the bid item quantities from the Department's web site to prepare a Bid Proposal for submission to the Department. Insert the completed bid item sheets printed from the Highway Bid Program into the Proposal and submit along with the disk created by said program. In case of a dispute, the Bid Proposal and bid item sheets created by the Highway Bid Program take precedence over any bid submittal. Furthermore the Department takes no responsibility for loss, damage of disks or the compatibility with the bidder's computer equipment or software.
SUBSECTION:	102.08 IRREGULAR BID PROPOSALS.
REVISION:	Add the following to the first set of items: 4) Fails to submit a disk created from the Highway Bid Program
SUBSECTION:	102.08 IRREGULAR BID PROPOSALS.
REVISION:	Replace 1) of the second set of items with the following: 1) when the Bid Proposal is on a form other than that furnished by the Department or printed from other than the Highway Bid Program , or when the form is altered or any part is detached.
SUBSECTION:	112.03.01 General Traffic Control.
PART:	I) Temporary Traffic Signals.
REVISION:	Replace the MUTCD reference "Section 4B" with "Chapter 4D"
SUBSECTION:	212.03.03 Permanent Seeding and Protection.
PART:	A) Seed Mixtures for Permanent Seeding.
REVISION:	Replace with the following: A) Seed Mixture for Permanent Seeding. Use seed Mixture No. I or as the Contract specifies. Mixture No. I: 75% Kentucky 31 Fescue (Festuca arundinacea) 10% Red Top (Agrostis alba) 5% White Dutch Clover (Trifolium repens) 10% Rygrass, perennial (Lolium perenne)

Supplemental Specifications to The Standard Specifications for Road and Bridge Construction, 2000 Edition

(Effective with the October 25, 2002 Letting)

SUBSECTION:	212.03.03 Permanent Seeding and Protection.
PART:	C) Crown Vetch.
REVISION:	Replace the first sentence with the following: Sow crown vetch seed on all areas having a slope 3:1 or steeper and consisting of soil or mixtures of broken rock and soil.
SUBSECTION:	212.03.03 Permanent Seeding and Protection.
PART:	E) Erosion Control Blanket.
REVISION:	Replace the first sentence with the following: Install erosion control blankets in ditches, except those to be paved or rock lined, to a flow depth of 1.5 feet.
SUBSECTION:	402.03.02 Acceptance.
PART:	C) Setup.
REVISION:	Add the following after the second sentence: For mixtures with a total-project quantity between 500 and 1,000 tons, perform a minimum of one process control test for AC, AV, and VMA, and report the results to the Engineer.
SUBSECTION:	402.03.03 Verification.
REVISION:	Replace the first two sentences with the following: For volumetric properties, the Department will perform a minimum of one verification test for AC, AV, and VMA for each lot according to the corresponding procedures as given in Subsection 402.03.02. For specialty mixtures, the Department will perform one AC and one gradation determination per lot according to the corresponding procedures as given in Subsection 402.03.02. However, Department personnel will not perform AC determinations according to KM 64-405.
SUBSECTION:	403.02.06 Transport Equipment.
REVISION:	Add the following after the first sentence: Do not load trucks that are contaminated with an unapproved release agent. When such contamination is identified after loading, reject the load. In either case, remove the truck and respective driver from the project for the duration of the project.
SUBSECTION:	403.03.03 Preparation of Mixture.
PART:	A) Mixture Composition.
REVISION:	Replace the second sentence with the following: Conform to the gradation requirements (control points) of AASHTO MP2 for the Superpave mixture type the Contract specifies.
SUBSECTION:	403.03.03 Preparation of Mixture.
PART:	C) Mix Design Criteria.
REVISION:	Replace the first sentence with the following: Conform to the gradation requirements (control points) of AASHTO MP2 for the Superpave mixture.
SUBSECTION:	403.03.03 Preparation of Mixture.
PART:	C) Mix Design Criteria.
NUMBER:	2) Selection of Optimum AC.
REVISION:	Add the following: Ensure the optimum AC is a minimum of 5.0 percent by weight of the total mixture for all 0.5-inch nominal surface mixtures and 5.3 percent by weight of the total mixture for all 0.38-inch nominal surface mixtures.
SECTION:	403.03.06 Thickness Tolerance.
TABLE:	Nominal Maximum Size of Mixture vs. Thickness Range
REVISION:	Delete

Supplemental Specifications to The Standard Specifications for Road and Bridge Construction, 2000 Edition

(Effective with the October 25, 2002 Letting)

SUBSECTION: 403.03.09 Leveling and Wedging, and Scratch Course.
PART: A) Leveling and Wedging.
REVISION: Replace the first sentence with the following:

Conform to the gradation requirements (control points) for base, binder, or surface as applicable.

SUBSECTION: 403.03.09 Leveling and Wedging, and Scratch Course.
PART: B) Scratch Course.
REVISION: Replace the second sentence with the following:

Conform to the gradation requirements (control points) for base, binder, or surface as the Engineer directs.

SECTION: 404 OPEN-GRADED FRICTION COURSE
TABLE: LOT PAY ADJUSTMENT SCHEDULE FOR SPECIALTY MIXTURES
REVISION: Replace the table with the table on the last page of this supplement.

SUBSECTION: 409.02 MATERIALS AND EQUIPMENT.
REVISION: Replace "KM 64-427" with the following:

the guidelines in Subsection 409.03.02

SUBSECTION: 409.03.01 Restrictions.
REVISION: Add the following sentence:

When the mixture's bid item specifies PG 76-22, limit RAP content to 20 percent or less.

PUBLICATION: 2001 Supplemental Specifications to The Standard Specifications for Road and Bridge Construction.
SUBSECTION: 409.03.02 Preparation of Mixture.
PART: A) Mix Requirements.
REVISION: Void the Revision and replace with the following:

Conform to the Contract requirements for each mixture produced using RAP. If mixtures produced using RAP do not conform to the requirements for that mixture, complete the project using all virgin materials at no additional expense to the Department. Conform to the following table to select the appropriate grade of virgin asphalt binder to blend with the RAP:

Mixture's Bid Item	Appropriate Virgin Asphalt Binder		
	0-20% RAP	21-30% RAP	>30% RAP
PG 76-22	PG 76-22	-	-
PG 70-22	PG 70-22	PG 64-22	*
PG 64-22	PG 64-22	PG 64-22	*

* Select according to KM 64-427

SUBSECTION: 611.03.02 Precast Unit Construction.
REVISION: Replace the first sentence with the following:

Construct units according to ASTM C 1433 with the following exceptions and additions:

PUBLICATION: 2001 Supplemental Specifications to The Standard Specifications for Road and Bridge Construction.
SUBSECTION: 701.03.05 Joints.
PART: B) Corrugated Metal Pipe.
REVISION: Void the Revision and replace with the following:

Construct joints using a band with annular corrugations and a bolt, bar and strap connection. Use a minimum nominal band width of 12 inches for all pipe diameters 54 inches and smaller. Use a two-piece band with a minimum nominal width of 20 inches for all pipe diameters greater than 54 inches. Manufacture the band from the same base materials as the pipe. The pipe bands may be up to two gauges lighter than the pipe it is joining, with a minimum gauge thickness of 16. The Department may allow dimple band connections for field cut pipe. Install the connecting bands according to the manufacturer's written recommendations.

Supplemental Specifications to The Standard Specifications
for Road and Bridge Construction, 2000 Edition
(Effective with the October 25, 2002 Letting)

SUBSECTION:	710.02 MATERIALS.
REVISION:	Add the following Subsection:
	710.02.15 High Density Polyethylene (HDPE) Adjusting Rings. Conform to Section 846.
SUBSECTION:	710.03.01 Newly Constructed Small Drainage Structures.
PART:	A) General.
REVISION:	Replace the last sentence of the sixth paragraph with the following:
	Use precast concrete, precast concrete pipe sections, cast-in-place, brick, or HDPE adjusting rings for adjustment of existing manholes according to the Standard Specifications.
SUBSECTION:	710.03.03 Adjusted Small Drainage Structures.
REVISION:	Add the following sentence to the end of the first paragraph:
	For HDPE adjusting rings, install and seal according to the manufacturer's recommendations.
SUBSECTION:	713.03 CONSTRUCTION.
REVISION:	Replace the MUTCD references to "Part III" with "Part 3"
SUBSECTION:	714.03 CONSTRUCTION.
REVISION:	Replace the MUTCD references to "Part III" with "Part 3" and figure references to "3-11 and 3-12" with "3B-8 and 3B-9"
SUBSECTION:	714.03.01 Layout.
REVISION:	Replace the MUTCD reference to "Part III" with "Part 3"
PUBLICATION:	2001 Supplemental Specifications to The Standard Specifications for Road and Bridge Construction.
SUBSECTION:	714.05 PAYMENT.
REVISION:	Replace with the following:
	The Department will make payment upon completion of the work. If after the proving period the markings do not meet minimum retroreflectivity requirements, the Department will adjust the payment or require corrective work according to the following:
SUBSECTION:	718.01 DESCRIPTION.
REVISION:	Replace the second sentence with the following:
	See Section 3C.01 of the MUTCD for a general description.
SUBSECTION:	807.02.03 Joint Sealer for Ridged Pipe.
PART:	B) Rubber Gaskets.
REVISION:	Replace with the following:
	B) Butyl Rubber Sealants. Furnish butyl rubber sealants conforming to the materials, manufacture, and physical requirements for sealants in AASHTO M 198, Section 6.2. Use only products from the Department's List of Approved Materials.
SUBSECTION:	807.02.03 Joint Sealer for Ridged Pipe.
PART:	C) Flexible Plastic Gaskets.
REVISION:	Replace with the following:
	C) Rubber Gaskets. Furnish rubber gaskets conforming to the materials, manufacture, and physical requirements for gaskets in AASHTO M 315. Use only products from the Department's List of Approved Materials.

Supplemental Specifications to The Standard Specifications for Road and Bridge Construction, 2000 Edition

(Effective with the October 25, 2002 Letting)

SECTION: 846 HIGH DENSITY POLYETHYLENE (HDPE) ADJUSTING RINGS
REVISION: Add the following New Section:

SECTION 846 HIGH DENSITY POLYETHYLENE (HDPE) ADJUSTING RINGS

846.01 RESIN. Use a recycled polyethylene plastic or virgin resin producing a molded part meeting the following requirements:

Melt Flow Index (ASTM D 1238)	4.0-10.0 g/10min
Density (ASTM D 792)	0.941-0.965 g/cm^3
Tensile (ASTM D 638)	2000-5000 lb/in^2
ESCR (ASTM D 1693)	Condition C

846.02 LOADING. Ensure the adjustment rings meet or exceed the loading requirements of AASHTO'S Standard Specification for HS-25 wheel loading for Highway Bridges.

SECTION: 827.04 PERMANENT SEED.
REVISION: Replace with the following:

827.04 PERMANENT SEED. Conform to the requirements outlined in the "Kentucky Seed Law and Provisions for Seed Certification in Kentucky" and the "Regulations under the Kentucky Seed Law", with following exceptions:

1. Obtain seed only through registered dealers that are permitted for labeling of seed.
2. Ensure all deliveries/shipments of premixed seed are accompanied with a master blend sheet.
3. The Department may sample the seed at the job site at any time.
4. Ensure all bags and containers have an acceptable seed tag attached.

Do not use seed (grasses, native grasses and legumes) if the weed seed is over 2%, total germination (including hard seed) is less than 60%, if the seed test date is over 9 months old exclusive of the month tested, or if the limits of noxious weed seed is exceeded.

Ensure that noxious weed seeds contained in any seed or seed mixture does not exceed the maximum permitted rate of occurrence per pound.

Name of Kind	Max. No. Seeds (per pound)*
Balloon Vine (Cardiospermum Halicacabum)	0
Purple Moonflower (Ipomoea turbinata)	0
Canada Thistle (Cirsium Arvense)	0
Johnsongrass (Sorghum Halepense and Sorghum Almum and perennial rhizomatous derivatives of these species)	0
Quackgrass (Elytrigia Repens)	0
Annual Bluegrass (Poa Annua)	256
Buckhorn Plantain (Plantago Ianceolata)	304
Corncockle (Agrostemma Githago)	192
Dodder (Cuscuta spp.)	192
Giant Foxtail (Setaria Faberii)	192
Oxeye Daisy (Chrysanthemum Ieucanthemum)	256
Sorrel (Rumex Acetosella)	256
Wild Onion and Wild Garlic (Allium spp.)	96

* Seed or seed mixtures that contain in excess of 480 total noxious seeds per pound is prohibited

Wildflower seed shall not be planted until approved by the MCL.

Supplemental Specifications to The Standard Specifications for Road and Bridge Construction, 2000 Edition
(Effective with the October 25, 2002 Letting)

LOT PAY ADJUSTMENT SCHEDULE FOR SPECIALTY MIXTURES (TEST DEVIATION FROM JMF)		
	Pay Value	Deviation From JMF (%)
Asphalt Binder Content	1.00	0.0-0.5
	0.98	0.6
	0.95	----
	0.90	0.7
	0.85	0.8
	0.75	≥ 0.9
1 1/2 inch Sieve	1.00	0-13
	0.98	14
	0.95	15-16
	0.90	17-20
	0.85	21-23
	0.75	≥ 24
1 inch, 3/4 inch, and 1/2 inch Sieves	1.00	0-9
	0.98	10
	0.95	11-12
	0.90	13-14
	0.85	15-16
	0.75	≥ 17
3/8 inch, No. 4, No. 8, No. 16, and No. 30 Sieves	1.00	0-8
	0.98	9
	0.95	10
	0.90	11-12
	0.85	13-14
	0.75	≥ 15
No. 50 Sieve	1.00	0-6
	0.98	7
	0.95	8
	0.90	9
	0.85	10
	0.75	≥ 11
No. 100 Sieve	1.00	0-3
	0.98	---
	0.95	4
	0.90	5
	0.85	---
	0.75	≥ 6
No. 200 Sieve	1.00	0.0-2.0
	0.98	2.5
	0.95	3.0
	0.90	---
	0.85	3.5
	0.75	≥ 4.0
Fineness Modulus	1.00	0.0-0.30
	0.98	0.31-0.34
	0.95	0.35-0.39
	0.90	0.40-0.46
	0.85	0.47-0.55
	0.75	≥ 0.56

Special Notes

for

Boone County
ARTIMIS EXPANSION

Boone County
6-974
1200 D625 06 FD52 C008 7120101

I-71/75 ARTIMIS EXPANSION - PROJECT DESCRIPTION

GENERAL
This project includes furnishing and installing two overhead variable message signs (VMS), two video cameras on poles with lowering devices, one road weather information system (RWIS) and reference markers on I-75 from milepoint 171 to milepoint 179. This equipment will expand the traffic monitoring and advisory capabilities of the Advanced Regional Traffic Interactive Management Information System (ARTIMIS). The ARTIMIS operations center is located at 508 W Third Street, Cincinnati, OH.

SYSTEM COMPATIBILITY
The equipment installed shall be fully compatible with existing ARTIMIS equipment. For maintenance and compatibility reasons, unless otherwise specified, the Contractor shall furnish and install the same manufacturer and model of equipment currently in use. The Contractor may propose alternate equipment if compatible with the existing system. The Contractor may propose alternate equipment if newer models provide improved performance. All equipment shall be approved by the Engineer with input from the ARTIMIS System Integrator before purchase orders are issued. The Contractor is responsible for coordinating with the ARTIMIS System Integrator to obtain any additional information not covered in these specifications before obtaining equipment quotes and establishing a bid price. This pre-bid coordination is necessary due to the complexity of the project and need for compatibility with the existing system.

COMMUNICATIONS
Signs and Cameras shall communicate with the ARTIMIS control center over voice grade telephone lines. The Contractor shall be responsible for furnishing and installing all associated video compression and modem equipment required for operation. The Contractor shall be responsible for and coordinating and installing telephone service. The Contractor shall be responsible for coordinating with the ARTIMIS operations center to determine communications equipment configuration and settings. Sign controller firmware shall also support CDPD communications. CDPD modems shall not be installed. CDPD communications shall be compatible with Airlink modems as implemented in the Louisville, KY TRIMARC system.

EQUIPMENT AND MATERIALS
All equipment and materials shall be new. All equipment shall be the latest model and shall contain the latest firmware unless it can be shown that an earlier version is required for compatibility with existing ARTIMIS communication protocols.

SPECIFICATIONS AND WORKMANSHIP
Unless otherwise specified, the Contractor shall conform to the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition. All work shall be performed in a neat and professional manner. The Contractor shall remove debris and trash from work areas during construction. The Contractor shall and restore areas to original condition and clean up all debris after construction.

DAMAGE TO EXISTING FACILITIES

The Contractor shall be responsible for locating all underground utilities prior to excavation. The contractor shall repair damage to any public or private facilities at his expense. Utilities include but are not limited to telephone, power, water, gas, fiber optic cable, underground vaults, roadway lighting, traffic signal wiring, and roadway drainage systems.

GROUNDING

Unless otherwise specified, ground wiring shall be solid #4 AWG and securely connected inside enclosures with #4 AWG copper clamp connectors. Nuts and washers securing the wire are not acceptable. Ground wires shall be exothermically welded to the ground rods. The following devices shall be grounded to an array of two, 10' X 1" copper coated steel ground rods:

- Model 334 Enclosures
- Camera Poles
- RWIS equipment
- VMS and truss

All ground rods in arrays shall have a minimum of 6' separation.

AS-BUILT DRAWINGS

The Contractor, at the completion of the project shall submit as-built drawings to the Engineer. As-built drawings shall be submitted in electronic format. Electronic format shall be .pdf, .tiff, .dgn or other standard image format acceptable to the Engineer. As-built drawings may be scanned from marked up field plans or drawn in MicroStation. As-built drawings shall be scanned at a resolution that will allow them to be clearly legible on a computer display. As-built drawings shall include the exact location of all above ground equipment as well as underground conduit, wire, sensors and other equipment. Drawings shall indicate any changes to the design including change to the number of conductors, wire gage, splices, additional conduit etc. Conduit locations shall be drawn to scale or shall be dimensioned and referenced to permanent roadway features. Turns in conduit shall be referenced so that conduit path may be derived. Existing underground utilities shall be indicated on the drawings. Two copies of the drawings shall be submitted. One copy of the drawings shall be submitted to the Engineer. One copy of the drawings shall be submitted to the KYTC/Operations/ITS branch. The Contractor shall correct any drawings that are unacceptable to the Engineer.

SUMMARY OF QUANTITIES

UNITS	BID ITEM	DESCRIPTION	TOTAL QUANTITIES
EACH	2187	SITE PREPARATION	2
L.S.	2650	MAINTAIN AND CONTROL TRAFFIC	1
EACH	4740	POLE BASE	2
LIN FT	4791	CONDUIT - 3/4 INCH PVC	694
LIN FT	4795	CONDUIT - 2 INCH PVC	734
EACH	4810	JUNCTION BOX	3
LIN FT	4820	TRENCHING AND BACKFILLING	655
LIN FT	4832	WIRE - NO. 12	500
LIN FT	4833	WIRE - NO. 8	1,100
LIN FT	4836	WIRE - NO. 2	1,125
EACH	4871	POLE - 35 FT WOODEN	1
EACH	4899	ELECTRICAL SERVICE	2
EACH	4901	TELEPHONE SERVICE	2
EACH	4903	REFERENCE MARKER	160
EACH	4904	BARRIER MOUNTING BRACKET	80
LIN FT	6411	STEEL POST TYPE 2	440
CU. YD	6490	CLASS A CONCRETE FOR SIGNS	64.0
LBS	6491	STEEL REINFORCEMENT FOR SIGNS	4,727
EACH	7303	ROADWAY CROSS SECTION	2
EACH	7343	OSS 100' GALVANIZED STEEL (VMS)	2
EACH		REMOVE AND REPLACE MEDIAN BARRIER	1
EACH		POLE 50' WITH LOWERING DEVICE	2
EACH		WINCH LOWERING TOOL	1
EACH		CAMERA INTERFACE BOX	2
EACH		CCTV ASSEMBLY	2
EACH		CCTV KEYBOARD CONTROLLER	1
EACH		VIDEO TRANSMISSION SYSTEM	2
EACH		CCTV CONTROL CABLE 1000 FT	1
EACH		RWIS TOWER	1
EACH		RWIS EQUIPMENT	1
EACH		VARIABLE MESSAGE SIGN 3 X 24	2
EACH		MODEL 334 ENCLOSURE	2
EACH		TELEPHONE CABLE	1,100
EACH		PHONE LINE SHARING DEVICE	1

SPECIFICATIONS FOR SITE PREPARATION

DESCRIPTION
Site Preparation shall include all materials and miscellaneous work required access and protect the work area. This item includes excavation, guardrail removal, guardrail replacement, guardrail extensions, temporary ditch crossings, temporary barriers and clearing of debris and foliage.

MATERIALS
All materials shall conform to the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition. The Contractor shall submit to any material testing required by the Engineer. Salvaged materials may be used at the discretion of the Engineer.

INSTALLATION
Materials shall be installed in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition and KYTC standard drawings.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Site Preparation shall be paid for per unit each. The Contractor shall coordinate with the Engineer before performing site preparation work. This item also includes all costs associated with developing as-built plans.

SPECIFICATIONS FOR MAINTAIN AND CONTROL TRAFFIC

DESCRIPTION
Traffic shall be maintained in accordance with the current editions of the "Manual of Uniform Traffic Control Devices", the "Standard Specifications For Road and Bridge Construction" and the "Standard Drawings".

It is the intention to perform the required work with the least inconvenience to the traveling public while providing maximum safety to the Contractor and the traveling public. Any variances from these specifications must be approved in advanced by the Resident Engineer. This Engineer is herein referred to as the Engineer.

This item shall include the preparation and implementation of traffic control plans based on the Contractor's schedule of work activities.

This will require a Professional Engineer, registered in the state of Kentucky, to be in charge of designing, implementing, and monitoring traffic maintenance plans. This Engineer is herein referred to as the Traffic Control Engineer.

The Traffic Control Engineer and his staff shall have experience in this field satisfactory to the Kentucky Transportation Cabinet. This documentation shall be furnished at the preliminary construction meeting for review and approval. In addition, the Traffic Control Engineer shall have design experience in this field acceptable to the KYTC.

The Traffic Control Engineer and his team shall have expertise and resources to:

- Develop and design traffic control plans meeting current standards. These plans shall be submitted to and approved by KYTC.

- Monitor accident data, if needed after approval and implementation, and recommend changes based on this analysis.

- Provide, install, maintain, and subsequently remove the required traffic control equipment and pavement marking features.

- Provide quick response to on site problems or accident damage.

- Coordinate these operations with the Engineer or local municipalities when necessary.

TRAFFIC CONTROL PLANS:

Traffic control plans shall be submitted to the Engineer two weeks prior to work in the area covered by the plan. This submittal shall consist of five copies of the plans for review and distribution. No work shall begin at any location until the traffic control plan has been approved by KYTC.

PLAN IMPLEMENTATION:

The Traffic Control Engineer shall be responsible for providing, installing, maintaining, and the subsequent removal of all traffic control equipment, pavement markings, signs, overlays or other features necessary to implement the approved plan at each work site.

RESPONSE PLAN:

The Contractor shall provide a means of quick response to on site problems or accidents to maintain the system twenty-four (24) hours per day seven (7) days a week to the satisfaction of the Project Engineer. The Traffic Control Engineer shall have necessary authority to perform any work necessary to rectify any problems. The Traffic Control Engineer and the Project Engineer shall have a constant means of communication for the purpose of maintaining traffic control.

MATERIALS

Maintain and Control Traffic shall include:

- All labor and materials necessary for construction and maintenance of traffic control devices, signage and markings.

- All flag persons and traffic control devices such as, but no limited to, signs, flashing yellow lights, continuous burning lights on drums or barricades during night operations, barricades and vertical panels, plastic drums (steel drums will not be permitted) and cones, necessary for the control and protection of vehicular and pedestrian traffic as specified in these notes, The Manual on Uniform Traffic Control Devices or the Engineer.

- A law enforcement officer(s), with a patrol car, for the exclusive purpose of controlling traffic for total temporary interstate and/or ramp closure.

- Communications such as mobile phone between the Contractor and the Engineer for the purpose of traffic control.

- Portable flashing arrows for all lane closures. The portable flashing arrows shall be mounted on traffic-worthy carriages that meet all applicable safety standards. The arrows shall be solar powered and shall meet the requirements specified in the current standard drawings.

- One (1) reserve flashing arrow to be placed in operation in the event of damage or mechanical/electrical failure. The reserve flashing arrow shall become the property of the Contractor at the completion of the project.

- Two (2) portable variable message signs for advance warning of lane closures, ramp closures, temporary road closures and the like. The locations of placement of the variable message shall be approved by the Engineer. . The portable variable message signs shall become the property of the Contractor at the completion of the project.

All temporary traffic control items, devices, materials and incidentals shall remain the property of the Contractor, unless otherwise addressed, when no longer needed.

INSTALLATION

In general, all traffic control devices shall be placed starting and proceeding in the direction of the flow of traffic and removed starting and proceeding in the direction opposite to the flow of traffic.

The Contractor shall arrange his operations so as to prevent interference to the continuous flow of traffic. All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement. Vehicles and equipment shall not park or stop except within designated work areas, and shall enter and leave work areas in a manner which will not be hazardous to or interfere with the normal traffic flow. Personal vehicles will not be permitted to park within the right-of-way except in specific areas designated by the Engineer.

The Contractor shall completely cover any signs, either existing, permanent or temporary which do not properly apply to the current traffic phasing, and shall maintain the covering until the signs are applicable or are removed.

The Contractor shall advise the Engineer in advance of all road/lane closures as follows:

- 48 hours notice on all lane closures
- 72 hours notice on total interstate roadway and ramp closures

If the Contractor desires to deviate from the approved traffic control scheme, he shall prepare an alternate plan and present it in writing to the Engineer. This alternate plan can be used only after review and approval of the Divisions of Traffic, Design and Construction and the Federal Highway Administration, where applicable.

If traffic should be stopped due to construction operations, and an emergency vehicle on an official emergency run arrives on the scene, the Contractor shall make provisions for the passage of that vehicle as quickly as possible.

Before work begins, the Contractor shall submit to the Engineer the names and telephone numbers of a person or persons who can be contacted 24 hours per day by the Kentucky Transportation Cabinet and all interested police agencies. This person or persons shall be responsible for placing or replacing necessary traffic control devices during all hours when traffic is restricted to less than the number of existing lanes in any direction. The Contractor shall employ at least one qualified person to be available 24 hours a day to maintain all lights, drums, signs, barricades, and the like in order to provide a safe facility for the traveling public in restricted areas. He shall have available all tools and materials necessary to perform this function at all times.

The Contractor shall inspect any traffic control left in place when he is not otherwise working on four (4) hour intervals.

The Contractor's vehicles shall always move with and not against the flow of traffic. Vehicles shall enter and leave work areas in a manner which will not be hazardous to or interfere with normal traffic. Vehicles shall not park or stop except within work areas designated by the Engineer.

Pavement Drop Off. Pavement edges that traffic is not expected to cross, except accidentally, should be treated as follows:

- Less than two inches--no protection required. Warning signs should be placed in advance and throughout the drop-off area.

- Two to four inches--place plastic drums, vertical panels or barricades every 100 feet on tangent sections for speeds of 50 miles per hour or greater. Cones may be used in place of plastic drums, panels and barricades during daylight hours. For tangent sections with speeds less than 50 miles per hour and for curves, devices should be placed ever 50 feet. Spacing for tapers should be in accordance with the "Manual on Uniform Traffic Control Devices".

- Greater than four inches--positive separation or wedge with 3:1 or flatter slope needed. If there is eight feet or more distance between the edge of pavement and drop-off drums, panels or barricades may be used. If concrete barriers are used, special reflective devices or steady burn lights should be used for overnight installations.

- For temporary conditions, drop-offs greater than four inches may be protected with plastic drums, vertical panels or barricades for short distances during daylight hours while work is being done in the drop-off area.

The use of shoulders to maintain traffic is prohibited except as noted in the following section on lane ramp closures or upon approval of the Engineer. Should any existing shoulder areas become damaged or destroyed due to the Contractor's negligence or failure to provide adequate signs, drums or other traffic control devices, the restoration of the shoulder will be at the Contractor's expense.

These traffic notes are intended to provide for the minimum traffic requirements consistent with safety. Should the Contractor wish to devise alternate methods including full closures, he shall submit such alternates to the Engineer at least 30 days prior to implementing such alternates for consideration and approval.

Traffic is to be maintained in an uniform pattern throughout the entire length of the project including crossroads and is not to be subjected to constant lane shifts. Work can be performed simultaneously in the northbound and southbound lanes or eastbound and westbound lanes within each specified construction section provided the operations do not interfere with each other. The Contractor shall arrange his operations so as to prevent any interference to the continuous flow of traffic. All vehicles, equipment, workers and their activities are restricted at all times to one side of the directional pavement unless otherwise approved by the Engineer.

HOLIDAYS, WEEKEND & SPECIAL EVENTS RESTRICTIONS

No lane or shoulder closures shall be allowed during the following times:

- Between 12:00 noon Friday and 6:00 A.M. Tuesday when the holiday is observed on a Monday: New Year's Day, President's Day, Memorial Day, Labor Day, Christmas.

- Between 12:00 noon Thursday and 6:00 A.M. Monday when the holiday is observed on a Friday: Good Friday.

- Between 12:00 noon on the day before the holiday and 6:00 A.M. on the day following the holiday when the holiday is observed midweek: Independence Day.

- Between 12:00 noon on the day before Thanksgiving and 6:00 A.M. the following Monday.

- For two hours before, and one hour after, all major events at Paul Brown Stadium and other major events such as Tall Stacks and Riverfest. The Contractor shall contact the stadium to obtain a schedule of events to assist in coordinating the work.

The Contractor shall maintain a minimum of two lanes in each direction at all times on the interstate roadways, one lane on entrance and exit ramps, and one lane in each direction on surface streets, except as noted, or upon approval of the Engineer.

For lane closures when required for the installation of conduit, pull boxes, poles, foundations, side mount signs, sign supports, guardrail and the like, the Contractor shall close the lane(s)/shoulder per standard drawings. When lanes must be closed overnight, drums must be used.

INTERSTATE ROADWAY LANES:

No lane closures are permitted during the peak hours of 6:30 A.M. to 9:30 A.M. and 3:30 P.M. to 6:30 P.M. on Monday through Friday except where the left lane must be closed for the installation of changeable message sign foundation in the median or upon prior approval of the Engineer.

INTERSTATE ENTRANCE AND EXIT RAMPS:

When ramps have two full lanes or one lane with sufficient shoulder width to provide one lane, the ramp can be partially closed except during the peak hours of 6:30 A.M. to 9:30 A.M. and 3:30 P.M. to 6:30 P.M. on Monday through Friday.

Where ramps have only one full lane, and not sufficient shoulder width to provide one lane at traffic, the ramp may be closed for a maximum of four hours between the hours of 10:00 P.M. and 6:00 A.M. of the following day. If a ramp closure requires over four hours, the Contractor shall submit to the Engineer for his approval, a plan for a detour of traffic.

FINES

The Contractor may be assessed a one thousand dollar ($1,000.00) per hour fine for lane closures exceeding the specified time period unless prior approval is obtained from the Engineer.

Procedure for Erecting Overhead Sign Supports. Erection of span type overhead supports shall be accomplished in such a manner that complete stoppage on all lanes of any directional roadway is not more than fifteen (15) minutes in any one (1) thirty (30) minute period. The work shall be done between the hours of 1:00 A.M. and 4:00 A.M.

Total road closures shall be accomplished by means of a rolling road block. Law enforcement officer(s) with patrol vehicle(s) shall be used to pace traffic. The patrol vehicles shall have high-rise flashing beacons to provide adequate visibility to approaching vehicles. When the Engineer deems appropriate, restrictions may be used to funnel traffic into fewer lanes at the work stoppage area. Where stoppages back up in the vicinity of freeway entrances, the Contractor shall place a flagman and appropriate signs on the ramps to stop traffic. When the Engineer deems appropriate, the Contractor shall erect and maintain "ROAD WORK AHEAD," "BE PREPARED TO STOP," and "STOP AHEAD" signs with flashing twelve inch (12") yellow traffic signal heads. These signs shall be illuminated during the night operation.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Maintenance of Traffic will be paid for per unit lump sum for the project. Payment shall be made as follows:

At the lump sum bid for Item Special Traffic Control Planning and Implementation. 20% upon approval and implementation of the initial plan and installation of required traffic control devices. 80% prorated over the remaining working time in the contract. The Engineer shall consider the magnitude of traffic control being implemented in the estimate period and prorate the cost accordingly. This item shall include law enforcement officers, signs, cones, lane closures, shoulder closures, temporary barriers, portable changeable message signs, flashing arrow panels, and all labor, materials, tools, equipment, and any other incidentals.

SPECIFICATIONS FOR REMOVE AND REPLACE MEDIAN BARRIER

DESCRIPTION

Remove and replace median shall consist of all material and labor required to integrate sign support base into an existing barrier median.

MATERIALS

All materials shall conform to the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition. The Contractor shall submit to any material testing required by the Engineer.

INSTALLATION

Materials shall be installed in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition and KYTC standard drawings. This item shall consist of removing the existing median barrier and constructing new median barrier at all sign locations.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Remove and replace median will paid for per unit each for the project. This item shall include all material and labor required to remove and replace median barrier including roadway lighting conduit, wire, poles, anchor bolts, reinforcing steel, ground rods, junction boxes, drainage structures and all other structures and equipment associated with the median barrier. The Contractor shall be responsible for maintaining lighting throughout the project as directed by the Engineer. This item includes the construction of temporary lighting circuits required to maintain lighting.

SPECIFICATIONS FOR ROADWAY CROSS SECTION

DESCRIPTION
Roadway cross section shall include all work required to survey the sign location and develop a cross section showing the heights of the sign footings and truss end posts.

MATERIALS
No materials are required.

INSTALLATION
No installation is required.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Roadway Cross Section will be paid for per unit each. A copy of the cross section approved by the Engineer shall be submitted with the truss shop drawings.

SPECIFICATIONS FOR POLE BASE

DESCRIPTION
The pole base shall be constructed in accordance with the plans and specifications.

MATERIALS
Materials shall be in accordance with the plans and specifications. Materials shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION
The Contractor shall install the pole base in accordance with the plans and specifications. The Contractor shall stake all proposed pole base locations before excavation. Poles located behind guardrail shall have a minimum 4' spacing from edge of pole to face of guardrail, otherwise poles shall be located a minimum of 30' from all driving lanes. The Contractor shall obtain approval of staked locations before excavation. The KYTC Division of Operations, ITS Branch will approve locations for all field devices. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with the Cabinet. KYTC approval of field device location does not relieve the contractor from his responsibility to avoid utilities and repair any damage to buried infrastructure. All materials shall be installed in a neat and professional manner. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Pole bases will be measured for payment per unit each, complete and in place. This item includes all excavation including any special equipment required to install the base in rock. This item includes concrete, anchor bolts, reinforcing steel, and conduit within base.

SPECIFICATIONS FOR POLE WITH LOWERING DEVICE

DESCRIPTION

Pole with lowering device shall be designed to support and lower a closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent. and thus, must be considered a single unit or system. The lowering system shall consist of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, and camera connection box. The pole with lowering device shall withstand wind forces of 100mph with a 30 percent gust factor using a 1.65 safety factor. The lowering device manufacturer shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area, the actual EPA or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of 2 years of experience in the successful manufacturing of such systems.

MATERIALS

Camera lowering device shall be [MG]² Model CLDMG2, Camera Lowering Systems CDP series or approved equal.

SUSPENSION CONTACT UNIT

The suspension contact unit shall have a load capacity 200 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video cabling. The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering and raising operations.

The female Socket contact half of connector shall be made of thermosetting synthetic polymer. Each set contains 10 socket contacts permanently molded into the polymer body. There shall be 20 High conductivity brass socket contacts with permanently attached wire leads. The male contact block half shall contain High conductivity brass pin contacts with permanently attached wire leads molded into a polymer body. Ten contacts per set. Two sets (20 contacts) for each complete disconnect unit. Current carrying and signal wires in groups of 5 each for both the pin and socket halves of the connector. Constructed of 18 AWG stranded wire. Pin contact half of connector shall be made of thermosetting synthetic polymer. All pins and wires shall be molded in place. Two identical sets of 10 contacts each required for a complete disconnect unit. Male Pin contact halves shall be mounted to lower portion of disconnect unit.

All pulleys for the camera lowering device and portable lowering tool shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 wire each.

All electrical and video connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits and one (1) volt peak-to-peak video signals as well as the power requirements for operation of dome environmental controls. A direct coax connection is acceptable but not required.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

POLE

Pole shall be in accordance with the 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." Minimum Loading requirements shall be based on an isotach wind velocity for the area of installation according to 1994 AASHTO isotach wind chart with a 1.3 gust factor. Calculations and detailed drawings shall be submitted demonstrating compliance with the AASHTO specification.

POLE WELDING

All welding shall be in accordance with Sections 1 through 8 of the American Welding Society (AWS) D1.1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and be visually inspected. Longitudinal welds suspected to contain defects shall be magnetic particle inspected. All circumferential butt-welded pole and arm splices shall be ultrasonically or radiographically inspected.

POLE MATERIALS

All materials and products shall be manufactured in the United States of America, and comply with ASTM or AASHTO specifications. Mill certifications shall be supplied as proof of compliance with the specifications.

POLE DESIGN

The pole top deflection shall not exceed one inch in a 30-mph (non-gust) wind. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole calculations shall be analyzed at the pole base, at 5-ft. pole intervals/segments and at any other critical pole section. Design shall be based on wind loading from a Diamond KD6 dome enclosure.

The pole shaft shall be one piece construction up to 50' in length, and shall conform to ASTM A595 Grade A with a minimum yield strength of 55 ksi or ASTM A572 with a minimum yield strength of 65 ksi. Poles greater than 50' in length shall be of two piece construction. The shaft shall be round or 16 sided with a four

inch corner radius, have a constant linear taper of 0.14 in/ft, and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Longitudinal seam welds within 6 inches of complete penetration pole to base plate welds shall be complete penetration welds. The shaft shall be hot dip galvanized per the requirements of the contract documents.

POLE HAND HOLES
The hand hole opening shall be reinforced with a minimum 2-inch wide hot rolled steel rim. The nominal outside dimension is 6 inches x 27 inches. The handhole shall have a tapped hole for mounting the portable winch thereto as shown on the drawings.

POLE TOP TENON
A tenon shall be welded to the pole top with mounting holes and slot as required for the mounting of the camera-lowering system. The tenon shall be of dimensions necessary to facilitate camera lowering device component installation. Each slot shall be parallel to the pole centerline for mounting the lowering device.

POLE CABLE SUPPORTS
Electrical Cable Guides and Parking Stand (Eyebolts): Top and bottom electrical cable guides shall be located within the pole aligned with each other as referenced in the drawings. One cable guide shall be positioned 2 inches below the handhole and the other shall be positioned 1 inch directly below the top of tenon. A parking stand shall be positioned 2.75 inches below the top of the handhole.

BASE PLATE
Base plates shall conform to ASTM A36 or A572 Grade 42. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar. Plates shall be hot dip galvanized per the requirements of the contract documents.

POLE ANCHOR BOLTS
Anchor bolts shall conform to the requirements of ASTM F1554 Grade 55. The upper 12 inches of the bolts shall be hot dip galvanized per ASTM A153. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts.

INSTALLATION
Pole shall be installed in the correct orientation and plumb. Pole shall be grounded in accordance with the plans and specifications. Damaged galvanizing shall be repaired with a paint approved by the Engineer.

CAMERA BALANCING
The Camera shall be weighted and balanced to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit will have sufficient weight to disengage the camera and its control components in order that it can be lowered properly.

CAMERA CONNECTIONS
The Camera shall be wired to the junction box in the same configuration as existing ARTIMIS equipment to provide interchangeability with existing units. The Contractor shall coordinate with the ARTIMIS operations center to obtain the connector pinout.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole with lowering device will be measured for payment per unit each, complete and in place. This item includes all assembly, mounting hardware, wiring, grounding, and mechanical and electrical adjustments. Due to the electrical connections involved, the CCTV Assembly must be installed to properly test the lowering device. The contractor shall demonstrate to the Engineer the proper and repeated operation of the lowering device. Proper camera operation and electrical connections shall be verified after each lowering device cycle.

SPECIFICATIONS FOR WINCH LOWERING TOOL

DESCRIPTION

The camera lowering device shall be operated by use of a portable lowering tool. This tool shall allow the camera to be raised and lowered with an electrically operated winch.

MATERIALS

The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable speed industrial duty electric drill motor. This tool shall be compatible with accessing the support cable through the hand hole of the pole. When attached to the hand hole, the tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive locking mechanism to secure the cable reel during raising and lowering operations. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

INSTALLATION

No installation is required. Lowering tools shall be delivered to a location determined by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Lowering tool will be measured for payment per unit each, in new condition, complete and delivered and passing inspection by the engineer.

SPECIFICATIONS FOR CAMERA INTERFACE BOX

DESCRIPTION

The Contractor shall provide an interface for each camera system installed. This interface shall provide an assortment of power, data, local camera setup, and communications capability.

MATERIALS

The Camera Interface shall be a Treehaven RoadWay Vision Systems Field Box Model RVSFB120E or approved equivalent.

Contact information:
Treehaven Technologies, Inc.
282 Treehaven Avenue
Powell, OH 43065-8510
614-791-8843

The Contractor must obtain approval from the Engineer prior to installing an equivalent device.
Special Provisions:

- Input voltage 120 VAC 50/60 Hz
- Input current 1.5 A
- Dome power output 24 V, 50/60 Hz, 1.25 A
- Heater power output 24 V, 50/60 Hz 5 A
- Operational temperature range 14°F to +140°F
- Video input connector BNC, 75 Ohms
- Monitor output connector BNC, 75 Ohms
- Joystick RS-422 interface
- Laptop RS-232 interface
- Remote control RS-422 interface

Features:

- Surge suppression on data, video and power supply lines
- Manual switch to select local or remote PTZ control

INSTALLATION

All materials shall be installed in a neat and professional manner. All installation services shall comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services must comply with all local, state and federal building, electrical and construction codes, and Motorola R-56 requirements. Coordinate layout and installation of cables with other installations. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Engineer. The method of panel mounting shall be approved by the Engineer. Camera interface shall be panel mounted and installed in the Model 334 Cabinets.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The Camera Interfaces will be measured for payment per unit each, complete and in place, after passing component and subsystem testing. The unit price includes all mounting hardware, shelving, connections, and incidentals necessary to complete the work.

SPECIFICATIONS FOR CCTV ASSEMBLY

DESCRIPTION

The Contractor shall provide a CCTV Assembly at each site shown on the plans.

MATERIALS

The CCTV Assembly shall be an Ultrak UltraDome KD6 WeatherDome or approved equivalent.
Contact information:
Ultrak
4465 Coonpath Road
Carroll, OH 43112
800-443-6680
The Contractor shall obtain approval from the Engineer prior to installing an approved equivalent device. Proposed alternates shall be commercially available. The Contractor shall identify to the Department, an installed site, where the proposed CCTV Assembly has been operating for a period of at least one-year in a similar climate region.
The CCTV Assembly shall include the following:

UPPER WEATHTER DOME

The upper weather dome housing shall have the following features:

- The upper inner dome or can shall be constructed of steel.
- The upper outer dome or shroud shall be constructed of white, reflective ABS plastic. The shroud shall be designed to protect the weather dome from radiant heat from the sun and precipitation.
- The weather dome housing shall be designed for outdoor pendant, wall, and roof (parapet) installation.
- The weather dome housing shall be designed to mount to 1-1/2 in pipe.
- Adapters for pole and corner mounting shall be optionally available.
- The weather dome housing shall provide quick, positive disconnect to the dome drive unit.
- The upper weather dome shall measure 12.38 in. in diameter by 14.38 in. in height excluding the lower dome and the mounting nipple.
- The dome shall be capable of operating in a temperature range of between –22° and +120 ° F.
- The power, data, and video inputs and outputs shall have built in transient surge protection.

DOME DRIVE UNIT

The dome drive unit shall have the following features:

- On power up of the dome drive, the equipment shall clearly display the revision and part number of the unit and telephone number for service and support.
- The drive shall have a continuous angular travel of 360-degrees horizontal, and tilt of 0-degrees horizontal to 90-degrees down.
- The manual mode speed of the dome drive shall be variable from 0.10-degrees to 400-degrees per second in the horizontal axis and be variable from 0.10-degrees to 200-degrees per second in the vertical. The maximum manual mode speed of the dome drive shall be programmable between 400(200), 200(100), and 100(50) degrees per second for pan (tilt).
- Provide a built-in menu system for on-screen setup of camera functions and system control.
- The dome drive address shall be added to the camera video if programmed to do so.

- The dome drive shall have a programmable mode where the maximum manual drive speed can be made dependent on the camera lens zoom angle. If enabled the maximum manual drive speed shall decrease as the zoom angle narrows, and shall increase as the zoom angle widens.
- The dome drive shall be capable of storing 100 pre-programmed positions with a 24-character label associated with each position. Whether the pre-programmed position labels is added to the camera video shall be programmable. The position of the label on the video raster shall be selectable.
- The minimum time for the pan and tilt drives to reach a pre-programmed position shall be 0.6 second (180 degrees travel).
- The pre-programmed position accuracy of the dome drive shall be better than 1/10-degree.
- The dome drive shall be capable of storing up to 10 video tours with each tour being composed of up to 64 programmed positions.
- The dome drive shall incorporate a selectable auto-pivot mode to rotate the camera 180 degrees at the bottom of tilt travel.
- The dome drive shall send the camera to a pre-programmed home position after a programmed inactive time.
- The dome drive shall have 16 programmable sectors with a 24-character label associated with each sector. The border of each sector shall be defined by upper and lower tilt coordinates and right and left pan coordinates. The dome drive shall be considered to be within a sector if the center of the field of view of the camera is within the sector. The sector label shall be displayed whenever the dome drive is within that sector if programmed to do so.
- The dome drive shall have ten programmable privacy zones that shall blank the camera video when the camera field of view includes any part of a privacy zone that has been activated. A 24-character programmable title shall be associated with each privacy zone. The privacy zone's title shall be displayed whenever that privacy zones causes the camera video to be blanked.
- The dome drive shall have a learn mode for programming up to three 2 minute patterns. The patterns shall capture the pan, tilt, zoom focus and iris information for a period of up to 2 minutes and replay this information at the user's request.
- The dome drive shall have the capability to accept 4 alarm inputs, which shall initiate any preprogrammed position, tour or pattern. The alarm input shall be normally open dry contact.
- The dome drive shall upon command display an historical table of events, which can be used for diagnostic purposes.
- The dome drive shall have a rotating black ABS liner to mask the drive unit and camera from public view.
- The internal power supplies of the dome drive shall be isolated from the input 24V ac power.

CAMERA

The system camera shall have the following features:

- The following camera control options shall be available:
  - Digital zoom on/off.
  - Manual zoom speed control.
  - Backlight compensation on/off.
  - Auto focus on, zoom only/on, pan/tilt/zoom off.
  - Auto focus during tours on/off.
  - Video freeze-frame to eliminate the movement of the scene during pre-programmed position changes while running a video tour.

- The color camera (model CA447S4N) shall be as follows:
  - The image pickup device shall be a ¼ inch Super HAD CCD.
  - The NTSC version of the camera shall have 768H x 494V effective pixels (380,000 pixels)
  - The resolution of the camera shall be 470 TVL.
  - The minimum scene illumination requirements shall be 1.7 lux with 1/60 second shutter, and 0.15 lux with ¼ second shutter; at F/1.4, with 100 percent scene reflectance, and a video level of 50 IRE units.
  - The S/N ration shall be greater than 50dB.

LOWER DOME

The lower dome shall have the following characteristics:

- The lower dome construction shall be of vacuum-formed, optically graded acrylic.
- The lower dome shall be attached to the upper housing by means of three quarter turn fasteners. There shall be a gasket between the upper housing and the lower dome.
- All weather domes shall include a lower inner black liner dome.
- Domes shall clear.
- Internal resistive type thermostatically controlled heater and blower.

RECEIVER DRIVER

The receiver driver shall have the following features:

- The receiver/driver shall be digital.
- The receiver/driver shall be contained within the dome.
- Communications shall be via RS-422.
- The receiver/driver shall have BCD (decimal) switch addressability.
- The receiver/driver memory shall be battery-backed.

INSTALLATION

CCTV Assemblies shall be installed on lowering device in accordance with the manufacturers instructions. All materials shall be installed in a neat and professional manner. All installation services will comply with all warranty provisions and warranty contract maintenance services in accordance with these specifications. All installation services shall comply with all local, state and federal building, electrical and construction codes, and Motorola R-56 requirements. All wiring entry to the CCTV Assembly shall use watertight fittings. All wiring entry and exits shall be made at the side or underneath components; no exposed top entry or exits are permitted. This requirement extends to all enclosures, junction boxes, or any other externally exposed devices.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The CCTV Assembly will be measured for payment per unit each complete and in place and after passing component and subsystem testing. This price includes the color camera, zoom lenses, environmental enclosure, pan/tilt unit, housing, dome, parapet mount, and all mounting hardware, connections, and incidentals necessary to complete the work.

SPECIFICATIONS FOR CCTV KEYBOARD CONTROLLER

DESCRIPTION

The Contractor shall furnish CCTV Keyboard Controllers and keyboards for the purpose of camera installation and testing.

MATERIALS

The CCTV Keyboard Controller shall be a Ultrak Model JPD-101 or approved equal, and shall meet the following minimum requirements:

FIRMWARE

The CCTV Keyboard Controller shall contain firmware that is compatible with Ultrak's KD-6 camera. All Camera Control Receiver functions controlled by the keyboard described herein shall be supported.

ENCLOSURE

The CCTV Keyboard Controller shall be constructed of high-impact plastic or aluminum.

CONTROL

The CCTV Keyboard Controller shall be capable of addressing and controlling up to 512 Camera Control Receivers.

DISPLAY

The CCTV Keyboard Controller shall provide an LCD for displaying camera ID and video output device designation.

CCTV CONTROL

The CCTV Keyboard Controller shall provide a joystick for controlling the cameras.

CCTV TEST JACK

The CCTV Keyboard Controller shall include an RJ-45 jack, which shall serve as the primary interface between the CCTV Keyboard Controller and the Camera Interface.

CONTROL CABLE

An RJ-45 cable shall be supplied with each controller for connection to the Camera Interface. The mating RJ-45 connector on the controller shall be wired in accordance with the manufacturer's recommendations.

INSTALLATION

No installation is required. Contractor shall use the CCTV Keyboard Controller and associated equipment to configure and test cameras. Upon completion of the Project, CCTV Keyboard Controllers shall be delivered to the Department at a location determined by the Engineer

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

CCTV Keyboard Controllers will be measured for payment per unit each.

SPECIFICATIONS FOR VIDEO TRANSMISSION SYSTEM

DESCRIPTION

Video transmission system shall allow color video transmission and PTZ camera control over voice grade telephone lines.

MATERIALS

Video transmission system shall be compatible with existing ARTIMIS video over phone systems. Unless otherwise approved, video transmission system shall be ADPRO Fast Scan Series III.

Video Inputs: 10 video channel inputs. 1V p/p video input, 75-ohm or high impedance

Video Output: 1 video output into a 75-ohm load.

Typical Image Transmission Time: 0.3 to 2.2 seconds - up to 12.5 images per second (PSTN) 0.2 to 0.6 seconds - up to 15 images per second (ISDN)

External bi-directional RS232 data link with Programmable baud rate, data bits, stop bits and flow control.

Image Resolution: Colour or black and white. Intensity - 256 grey levels; spatial resolution selectable between 752 x 480, 752 x 240, 376 x 240, 248 x 240, 88 x 120 (NTSC)

Communications Interface: Asynchronous or synchronous (programmable). RS232 interface (8 data bits, no parity, max baud rate = 192 kbps). Hayes (AT protocol)

Differential balanced input/output RS485 serial port for control of PTZ.

Power Requirements: Transceiver 90-130VAC, 60 Hz, 11VA (max) at 110V Transmitter 10 - 15VDC, 11 watts (max) at 12VDC.

Dimensions: Transceiver. Standard 19" rack-mount, 1U high subrack to DIN4194. Transmitter. Sealed cabinet for interior wall mounting.

Operating temperature range 0°C-50°C (32°F-122°F).

INSTALLATION

The Contractor shall install video transmitter in model 334 enclosure. The Contractor shall install the transceiver unit in the ARTIMIS operations center. The Contractor shall not disrupt normal ARTIMIS operations during the installation. The Contractor shall be responsible for any damage to existing ARTIMIS equipment. The Contractor shall repair or replace any equipment, cabling, or associated hardware damaged during installation at the Contractor's expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Video transmission system will be measured for payment per unit each complete and in place and fully functional in ARTIMIS operations. This item includes cables, connectors, power supplies, and all incidentals required for operation.

SPECIFICATIONS FOR CCTV CONTROL CABLE

DESCRIPTION
CCTV control cable is used to connect the CCTV assembly to the video transmission system.

MATERIALS
Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include Ultrak. Contractor may submit options, but will be subject to approval by the Engineer.
CCTV control cables shall be a composite cable consisting of one RG59 coax video cable and an appropriate number and size of copper conductors to meet the needs of the camera. Contractor shall coordinate with the camera manufacturer to ensure proper connectivity.
Applicable Specifications: UL/NEC/CEC CATV or CM. Flame Resistance: UL 1581 Vertical Tray.

INSTALLATION
The cable shall be a suitable length to allow installation between equipment without exceeding the minimum bend radius as specified by the manufacturer. Connectors shall be installed as necessary, and shall match the connector interface requirements for the equipment being connected. Adapters are not acceptable.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
CCTV Control Cabling shall be purchased on spools of approximately 1000ft. At the completion of the project, spools with 50ft or more leftover, shall become the property of the Department. All cables will be measured for payment per 1000ft spool, complete and in place, after passing applicable testes and demonstration of performance. All connectors, terminators, fittings, etc. will be considered incidental to the cost of installing the CCTV control cable and no separate payment will be made. CCTV Control Cabling will be paid for per unit each 1000ft spool.

SPECIFICATIONS FOR RWIS TOWER

DESCRIPTION

Road Weather Information Station (RWIS) tower shall consist of a foundation, cabinet mounting bracket, conduits, and tower.

MATERIALS

Tower shall be Universal Manufacturing Co. Model 9-30 or approved equal.

SECTIONS

Tower shall be comprised of three (3) sections with each section being ten (10) feet in length. Each section shall be an equilateral triangular truss design. Tower sections shall be constructed from aluminum. All necessary hardware for attaching tower sections together shall be supplied. Towers shall be supplied with a 1 1/4" I.D. collar.

BASE HARDWARE

Tower shall be provided with all necessary hardware for a base that will allow for tilting the tower over to the ground. This design shall allow the tower to be walked up to its raised position and walked down for lowering the tower to the ground. This shall include, but not be limited to, the anchor rods that are placed in the concrete foundation, the steel connectors or sleeves for attaching the tower legs to the anchor rods, and all necessary hardware for attaching the sleeves to the anchor rods and to the tower legs. The design of this base shall allow for the tower to drain properly.

WIND LOAD

Tower shall be rated for a minimum of nine (9) square feet wind load for a Wind Loading Zone of 80 MPH.

INSTALLATION

Tower shall be installed in accordance with the manufacturer specifications and the plans. The Contractor shall stake all proposed tower locations before excavation. The Contractor shall obtain approval of staked locations before excavation. The KYTC Division of Operations, ITS Branch will approve locations for all field devices. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with the Cabinet. KYTC approval of field device location does not relieve the contractor from his responsibility to repair any damage to infrastructure. The Contractor is responsible for positioning the tower foundation so that the tower may be tilted to the horizontal position without damage to the sensors, cabinet, conduit or any other obstruction. All materials shall be installed in a neat and professional manner. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Towers will be measured for payment per unit each, complete and in place. This item includes all excavation including any special equipment required to install the base in rock. This item includes concrete, anchor bolts, reinforcing steel, and conduit within base. The Contractor shall verify that there are no obstructions to tower lowering.

SPECIFICATIONS FOR RWIS EQUIPMENT

DESCRIPTION

Road Weather Information Station (RWIS) equipment shall consist of a datalogger and sensors to measure road temperatures and atmospheric conditions.

MATERIALS

DATALOGGER SPECIFICATIONS

GENERAL

Datalogger shall be an enclosed design to prevent debris from contacting the circuitry.

Datalogger shall store system configuration settings in non-volatile memory and resume operation from power interruptions without user intervention.

Datalogger shall support ASCII data transfer formats including comma separated values and fixed width, printer style ASCII. Datalogger shall be compatible with Campbell Scientific Loggernet polling software. Data format shall be compatible with Campbell Scientific RTDM software. Communication protocols and data formats shall be extensively documented and freely available.

Datalogger shall provide averaging, vector averaging, as well as standard arithmetic and statistical manipulation of data.

Datalogger shall provide data processing for logical and arithmetic equations based on multiple sensor inputs.

Datalogger shall have integral surge suppression that does not degrade when subjected to surge events. MOVs shall not be used for surge suppression.

Datalogger shall interface to thermistors, thermocouples, wind monitors, temperature/humidity sensors, solar radiation sensors, and other common environmental sensors.

Datalogger shall be Campbell Scientific CR10X or approved equal.

Datalogger Electrical Specifications

Analog Inputs	
Analog Inputs:	6 differential, 12 single ended
Absolute Accuracy:	± 0.1% [-25° to +50° C]
Ratiometric Accuracy:	± 0.02% [+10° to +30°C]
Channel Input Range Selection:	Software controlled
Dynamic Input Range:	± 2.5 mV to ± 2500 mV in 5 ranges
Input Resistance:	> 1G Ohm
Input protection	shorts, overvoltage, transients, ESD

Digital I/O

General purpose I/O	8 ports, Internal pull up
Input Sampling mode:	frequency, count, event counting
Frequency Range	up to 16 KHz
Sensor Excitation	
Number of Variable Outputs:	3
Voltage Levels	± 2.5 V
Voltage Regulation	± 2.5 mv
Current Sourcing	at least 25 mA
Selection Method	Software Controlled
Auxiliary Power Outputs	
12 VDC Switched Outputs:	600 mA (unregulated)
5 VDC Output	1 output up to 200 mA
Serial Communication	
Number of Serial Ports:	1 (minimum)
Interface Standards:	TTL, 9600 baud
Hardware	
Memory:	128 K Nonvolatile
System Configuration Storage:	Nonvolatile
Watchdog:	CPU Watchdog Timer
Network Support:	Unit Address
Real Time Clock:	± 60 sec/month accuracy, battery backup
Self Diagnostics:	Internal, sensor, power monitor
Power Requirements	
DC power:	10.7 to 16 VDC @ at 100 mA max
Standby Current:	3 mA
Battery Backup:	12 V, 6 AH minimum
Battery Charging:	Automatic charging and battery management

Physical Specifications

Datalogger Dimensions:	10.25" X 6" X 3.75" nominal
Datalogger Weight:	2 lbs nominal
Datalogger Temperature Range:	-25°C to +50°C

Warranty

Datalogger shall be supplied with a 12-month warranty from date of shipment.

Enclosure and supporting equipment

Datalogger and supporting equipment shall be mounted in a non-metallic enclosure. The contractor shall purchase the datalogger and supporting equipment pre-installed in the specified enclosure. The contractor shall be responsible for drilling the enclosure and furnishing and installing conduit hubs

Supporting equipment pre-installed in enclosure shall include:

- Power supply/backup battery and charging system
- 1200/9600 baud, extended temperature (-25° to +50° C), Hayes compatible modem. Modem shall be pre-programmed for remote polling operation.
- Enclosure Relative Humidity Sensor, Campbell Scientific 10162 or approved equal
- AC surge suppressor. Northern Technologies TCS-HWR or approved equal
- Telephone line surge suppressor. Joslyn Model 125 or approved equal
- Duplex receptacle
- Ground buss bar, ILSCO D167-8 or approved equal

Duplex receptacle and buss bar shall be supplied mounted to the backpanel but shall not be wired up or connected to the surge supressor. The contractor shall be responsible for connecting AC wiring and surge suppression.

One set of documentation including datalogger manual, sensor manuals and supporting equipment manuals shall be supplied with the order.

Enclosure
Enclosure shall be a white, non-metallic, NEMA 4X, fiberglass reinforced polyester unit. Enclosure cover shall be mounted with a continuous, stainless steel piano hinge and shall be secured with a stainless steel lockable latch. Enclosure interior dimensions shall be 18" X 16" X 8.7" nominal. Enclosure shall include mounting flanges or threaded inserts for securing to pole mounting hardware. Enclosure shall be equipped with a pre-punched and painted backpanel. Equipment shall be secured by nylon blind nuts. Sheet metal screws shall not be used to mount equipment. Enclosure shall be supplied with 12 extra backpanel mounting nuts.

Equipment shall be shipped pre-installed in the enclosure. Equipment shall be mounted as to maximize space for installation of additional equipment at the bottom of the enclosure.

Enclosure shall be Vynckier VJ1816 or equivalent

SENSOR SPECIFICATIONS

Sensor suite shall consist of the following sensors:

One (1) Air Temperature Relative Humidity Sensor
One (1) Wind Monitor
Two (2) Temperature Probes
One (1) Precipitation Sensor
One (1) Solar Radiation Sensor
One (1) Wetness Sensing Grid

General

Sensors shall be rugged units, designed for unattended operation and minimal maintenance.

Sensors shall be supplied with a comprehensive manual detailing the electrical characteristics, datalogger interface connections, datalogger programming examples, calibration constants, polynomial error correction coefficients, maintenance procedures and calibration requirements.

Sensors shall be supplied with the manufacturers standard warranty.

All sensor suites shall be delivered in one shipment.

Air Temperature Relative Humidity Sensor

Air Temperature Relative Humidity (RH) Sensor shall include Temperature/RH probe, solar radiation shield and mounting hardware

Probe Length:	10 inches
Probe Body Diameter:	1 inch
Filter:	0.2 µm Teflon® membrane
Filter Diameter:	0.75 inches
RH Measurement Range:	0.8 to 100% non-condensing
RH Output Signal Range:	0.008 to 1 Vdc
RH Accuracy at 20°C:	±1% RH against factory reference
Temperature Dependence of RH Measurement:	±0.05% RH/°C
RH Typical Long-Term Stability:	Better than 1% RH per year
RH Response Time (at 20°C, 90% response):	15 s with membrane filter
RH Settling Time:	500 ms
RH Supply Voltage:	12 Vdc Nominal
RH Current Consumption:	4 mA (Active)
RH Operating Temperature:	-40° to +60°C
Temperature Sensor:	1000 Ohm PRT
Temperature Measurement Range:	-39.2° to +60°C
Temperature Output signal range:	0.008 to 1.0V
Probe lead length	9'

Air Temperature RH probe shall be supplied with appropriate shield and mounting bracket for attachment to a vertical pipe.

Air Temperature RH probe shall be Vaisala HMP45C or approved equal.

Wind Monitor

Wind monitor shall be a helicoid propeller and vane style device.

Specifications:	
Speed Range:	0 to 50 mph
Survival:	220 mph
Threshold:	0.9 mph
Distance Constant:	10 ft
Signal Output:	sine wave: 90 Hz @ 20 MPH
Resolution:	0.1 mph
Accuracy:	0.25 mph
Direction Range:	360° mechanical <355° electrical
Accuracy:	2°
Survival:	220 mph
Threshold:	0.9 mph
Delay Distance:	4.3 ft
Signal Output:	Analog DC voltage
Power:	Regulated reference voltage for 10K potentiometer
Height Overall:	14.6 in
Length Overall:	21.7 inches including vane & prop
Prop Diameter:	7.1 in
Weight:	2.2 lbs
Lead Length	50'

Wind monitor shall be R.M. Young Model 5103 or approved equal

Temperature Probe

Temperature probe shall be a sealed unit designed for sensing air, soil and water temperature. Unit shall be sealed for immersion in water to 50'

Specifications:	
Temperature measurement range:	-35° to +50°C
Polynomial linearization accuracy:	Typically <±0.5°C over -38° to +50°C range,
<±0.1°C over -24° to +48°C range	
Lead Length	Determined by the Contractor

Interchangeability error:	Typically <±0.2°C over 0° to 50°C range increasing to ±0.4°C at -40°C

Precipitation Sensor

Precipitation sensor shall be a heated tipping bucket device for measuring rain and snow

Specifications:	
Orifice:	12-inch diameter
Accuracy:	±0.5% @ < 0.5"/hr rate
	±2.0% @ < 3.0"/hr rate
Resolution:	0.01 inch
Heating Element:	115 VAC 60 Hz 300 W w/thermostat
Weight:	11.2 pounds including 50' power and signal cable
Signal Cable:	50' 2-conductor shielded cable
Power Cable:	50' 115 V power cable
Operational Ranges:	-20° to 50°C; 0 to 100% RH

Unit shall be supplied with a mounting/leveling base for mounting to a 1.25 vertical pipe.

Precipitation sensor shall be Met One Model 385 or approved equal.

Solar Radiation Sensor

Solar radiation sensor shall be a silicon photovoltaic detector mounted in a cosine corrected head. Unit shall have a mV output across an integral shunt resistor. Unit shall be designed for direct interface to common datalogger units.

Specifications:	
Stability:	< ±2% change over a 1 year period
Response Time:	10 ms
Temperature Dependence:	0.15% per °C maximum
Cosine Correction:	Cosine corrected up to 80° angle of incidence
Operating Temperature:	-40° to +65°C
Relative Humidity:	0 to 100%
Detector:	silicon photovoltaic detector
Sensor Housing:	Weatherproof anodized aluminum case with acrylic diffuser and stainless steel hardware
Size:	0.94" dia x 1.00" H
Lead Length	11' minimum
Weight:	1 oz.
Accuracy:	±5% maximum
Sensitivity:	0.2 kW m -2 mV -1
Linearity:	Maximum deviation of 1% up to 3000 W m -2
Shunt Resistor:	Adjustable, 40.2 to 90.2 Ohms, factory set

Light Spectrum Waveband: 400 to 1100 nm

Unit shall be supplied with a base leveling fixture with built-in bubble level and adjustment screws, crossarm stand and one 90° mount for attaching crossarm stand to crossarm.

Unit shall be LI-COR LI200X or approved equal.

Wetness Sensing Grid

Wetness Sensing Grid shall provide a changing resistance in the presence of condensation or precipitation. Wetness Sensing Grid shall be provided with a lead length of 20 ft.

Wetness Sensing Grid shall be Campbell Scientific 237-L20 or approved equal.

INSTALLATION

Installation shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. Wiring shall be neat and orderly.

DATALOGGER WIRING AND PROGRAMMING

The KYTC will furnish a wiring diagram for wiring the sensors to the CR10X datalogger. The KYTC will program the CR10X datalogger via phone. The Contractor shall notify the Engineer when programming is required.

SENSOR CABLES

No splices will be allowed in any sensor cable without the approval of the Engineer. No sensor cable may be shortened without the approval of the Engineer. Cables shall be pulled through conduit by hand only.

ROADWAY TEMPERATURE SENSORS

Temperature sensors shall be installed approximately 5' into the lane. The surface temperature sensor shall be installed horizontally in a 4" saw slot. The subsurface temperature sensor shall be installed at the bottom of a 1" diameter hole drilled down 2' into the subgrade. Sensors shall be encased in loop sealant. The saw slot shall be sealed with loop sealant.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

RWIS Equipment will be measured for payment per unit each, complete and in place, after passing system and sensor testing. This item includes conduit, wiring, sensors, equipment, testing, calibration Master padlock with #2577 key and all other equipment and incidentals to construct a fully operational weather station.

SPECIFICATIONS FOR VARIABLE MESSAGE SIGN

DESCRIPTION

This Specification describes minimum specifications for the LED variable message sign(s) required by the contract. The contractor shall provide all the materials, software, and services necessary to deploy a VMS system that fully complies with the functional requirements specified herein, including incidental items that may have been inadvertently omitted.

Variable Message Signs shall be 3 line by 24 character. Signs shall use amber LED displays to generate 18" characters. Signs enclosure shall be a walk-in type constructed of aluminum. Enclosure size shall be sufficient for a technician to replace the LED panels, power supplies, control computer, fans , heaters, filters and all other equipment from inside the sign.

Signs shall communicate with the existing ARTIMIS central control system using NTCIP over dial-up phone lines. Sign software shall also support NTCIP communications over Airlink CDPD modems as implemented in the Louisville, KY TRIMARC project.

Sign controller shall be located within the sign enclosure. A ground mounted sign enclosure is not required.

Pre-Build Hardware Submittal

A hardware submittal shall be conducted prior to the equipment going into production to verify that the design can operate using the NTCIP protocol used at ARTIMIS. This test will be conducted by the ARTIMIS system integrator. The sign manufacturer shall supply a sign controller, power supply, three display modules, and any other equipment required for bench operation of the sign system. This equipment will be returned after the testing is complete. The sign manufacturer shall provide documentation and support for all NTCIP objects unique to the design.

Pre-Build Technical Submittal

The VMS manufacturer shall provide a complete technical submittal within 60 days of contract award and shall not proceed with VMS manufacture until the Engineer has approved the submittal.

The submittal shall include:

- All VMS manufacturer qualification information, as specified herein
- VMS Shop Drawing, including an illustration of the recommended installation method
- VMS structural calculations and certification, by a registered Professional Engineer
- VMS Site Riser Diagram
- AC Site Power Requirements, including legs and Amps per leg
- Major VMS schematics, including: AC power distribution inside and outside the VMS, DC power distribution within the VMS, and control signal distribution inside and outside the VMS
- Drawings of major VMS components, including: LED display modules, driver circuitry, control/logic circuits, pulse width modulation diagram, LED (Drive Current versus time) environmental control assemblies, VMS field controller, control equipment cabinet assembly, and control cabinet mounting footprint

- Catalog cuts for major VMS components, including: front face paint material, polycarbonate face material, LEDs, regulated DC power supplies, circuit board conformal coating material, hookup wire, signal cable, surge suppression devices, load center, circuit breakers, utility outlets, field controller motherboard computer, other purchased control/logic circuit boards, field controller power supply, ventilation/cooling fans, and ventilation filter
- Calculations for: display refresh rate, maximum VMS power consumption, and typical VMS power consumption
- VMS control software operator's manual.

VMS Manufacturer Qualifications

The variable message sign manufacturer for this contract shall:

- Have been in the business of manufacturing large outdoor permanently mounted LED VMS, which are used to manage vehicular roadway traffic, for a minimum period of five (5) years prior to the contract bid date. An "LED" VMS contains display pixels constructed solely of high-intensity discrete LEDs. A "large" VMS has the ability to simultaneously display a minimum of three (3) lines of twelve (12) 7x5 characters per line, with each character having a minimum height of twelve (12) inches (305 mm)
- Have in operation a minimum of one hundred (100) large outdoor permanently mounted LED VMS as defined above. Each of these VMS shall have successfully operated for a minimum period of one (1) year prior to the contract bid date
- Have in operation as of the contract bid date, a minimum of five (5) independently controlled VMS systems that communicate with a remote computer using NTCIP. These VMS systems shall be communicating over dial-up telephone, cellular telephone, spread spectrum radio, or fiber optic backbones. Each of the five systems shall contain a minimum of two (2) permanently mounted VMS. All systems shall be owned and operated by five different agencies. VMS manufacturer compliance with NTCIP standards shall have been tested and certified by an independent company, using the publicly available NTCIP Exerciser software test program, for a minimum of two (2) of the five systems.
- Have been in business under the same corporate name for a period of no less than five (5) years prior to the contract bid date
- Utilize a documented in-house quality management procedure that has been in place for no less than two (2) years prior to the contract bid date
- Utilize a documented certified welding procedure.

Documentation that proves the VMS manufacturer complies with these requirements shall be provided with the VMS manufacturer's pre-build technical submittal. This submittal shall also include references and project information for all of the manufacturer's VMS customers of the last five (5) years, including:

- Equipment owner/operator agency name
- Contact person name, telephone number, fax number, and e-mail address
- VMS system name and location of operations control center (project name/number, roadway name/number, state, county, country)
- VMS commissioning date (first date of successful on-site operation)
- VMS quantity
- VMS display pixel technology
- VMS display matrix size (pixel rows by pixel columns) and type (full matrix, line matrix, discrete character)
- VMS housing access type (walk-in, front access, rear access)
- Communications protocol used (NTCIP or proprietary; if proprietary, provide a name or description)
- Type of communications backbone used (telephone, fiber optic, direct, etc.)
- NTCIP compliance test reports prepared by independent companies
- Contact person name, telephone number, fax number, and e-mail address for each independent company that completed the NTCIP test report(s).

The pre-build submittal shall also include the following background information about the VMS manufacturer:

- Full corporate name
- Corporate address
- Contact person name, telephone number, fax number, and e-mail address
- Number of years in business under the current corporate name
- A copy of the VMS manufacturer's in-house quality management procedure
- Copy of the VMS manufacturer's certified welding procedure
- Copy of welding certifications for all personnel who will perform welding on the VMS housing
- General corporate literature, if available
- VMS product literature, if available.

Experience with manufacturing the following types of electronic sign products will not satisfy the requirements of this VMS specification:

- Indoor signs of any size or type
- Portable or mobile signs of any size or type
- Neon signs
- Back-lit signs
- Rotating drum or plank signs
- Lane control signs
- Blank out signs
- Any type of sign that is not pixelated and can not be programmed to display a nearly infinite quantity of messages
- VMS that have a pixel technology comprised of something other than high-intensity light emitting diodes (LED). Examples of unacceptable technologies are incandescent lamp, liquid crystal, fiber optic, flip disk, flip-fiber combination, and flip-LED combination
- VMS with a display matrix smaller than three lines of twelve 7x5 characters per line and having a character height smaller than 12 inches (305 mm)
- Outdoor electronic signs that are used for purposes other than roadway/motorway traffic management.

Failure to provide complete and accurate submittal information, as specified herein, will be cause for rejecting the VMS manufacturer.

Material, Manufacturing and Design Standards

VMS provided for this contract shall comply with the most recent revision of the following standards, if no revision date is given:

- Aluminum Welding – The VMS housing shall be fabricated, welded and inspected in accordance with ANSI/AWS D1.2-97 Structural Welding Code-Aluminum (1997)
- Electrical Components – High-voltage components and circuits (120 VAC and greater) shall be wired and color-coded per the National Electric Code

- Environmental Resistance – The VMS housing shall comply with type 3R enclosure criteria, as described in NEMA Standards Publication 250-1997, Enclosures for Electrical Equipment (1000 Volts Maximum)
- Maintenance Access – The LED display matrix and other internal VMS components shall be accessible through doorways located on side walls (left and right) of the sign housing (perpendicular to the LED display matrix)
- Optical Performance – The LED display shall be certified to Performance Level 1 of UK Highways Agency standard TR-2136, Issue B2, October 1998, Optical Performance Functional Specification for Discontinuous Variable Message Signs
- Structural Integrity – The VMS housing shall be designed and constructed to withstand a minimum sustained wind load of 100 mph (160 kph), with a 30 percent wind gust factor. The VMS housing shall support a front face ice load of 4 pounds per square foot (19.5 kg per square meter). The VMS housing shall be designed and constructed to comply with all applicable sections of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Third Draft, March 1999, as well as the fatigue resistance requirements of NCHRP Report 412, Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports.

VMS field controller hardware/firmware and VMS control software communications shall comply with the most recent revision of the following AASHTO-ITE-NEMA Joint Committee standards for NTCIP:

- 1101:1997 – NTCIP Simple Transportation Management Framework (STMF). This document was previously published as NEMA TS-3.2-1996
- 1201:1997 – NTCIP Global Object Definitions. This document was previously published as NEMA TS-3.4-1996
- 1203:1997 – NTCIP Object Definitions for Dynamic Message Signs. This document was previously published as NEMA TS-3.6-1997
- 2001 – NTCIP Class B Profile. This document was previously published as NEMA TS-3.3
- 2101 v01.10 (Recommended) – NTCIP Point-to-Multipoint Protocol/RS-232 Subnetwork Profile. This document was previously published as NEMA TS-3.PMP232
- 2301 – NTCIP STMF Application Profile. This document was previously published as NEMA TS-3.STMF
- 2202 v01.08 (Recommended) – NTCIP Internet Transport Profile. This document was previously published as NEMA TS-3.Internet v99.01.03.

Glossary

The following abbreviations and definitions shall govern this specification:

A – Amperes
AASHTO – American Association of State Highway and Transportation Officials
AC – Alternating current
AlInGaP – Aluminum Indium Gallium Phosphide. A type of LED semiconductor. See InGaAlP
ANSI – American National Standards Institute
AWS – American Welding Society
Baud Rate – The speed of serial communications
bps – Bits per second
C – Celsius
Cd – Candelas
CDPD – Cellular digital packet data
cfm – Cubic feet per minute
Communication Mode – Refers to the type of communications taking place between a control computer and a VMS. This can be dial-up or direct communications
Control Computer – A desktop or laptop computer used in conjunction with VMS control software to communicate with VMS field controllers. The control computer can instruct a VMS field controller to program and control the VMS, monitor VMS status, and run VMS diagnostic tests. A control computer can be used for remote control of one or more VMS, as well as for local control of a single VMS
COM Port – A serial port in the control computer that is used to communicate with the VMS field controller
CWI – Certified welding inspector
Dial-Up – A type of communication between a VMS and its control computer that requires a dialing modem. See also PPP communications
DC – Direct current
Direct – A type of communication between a VMS and its control computer that does not require a switched communications backbone. Direct communication does not require the use of modems, but it may require the use of signal converters (i.e., fiber optic). See also PMPP communication
Display Matrix – The programmable array of LED pixels used to display messages that are viewed by motorists and travelers
DMS – Dynamic message sign. Includes the display, controller, cabinet, and associated field equipment
Engineer – The authorized representative of the owner who is purchasing the VMS system specified herein
Entry Effect – The type of visual characteristic applied to all or part of a VMS display page in order to attract attention to, and create interest in, the message being displayed
F – Fahrenheit
Field Controller – A stand-alone computer that is located at a VMS site and which controls a single VMS. A field controller receives commands from and sends information to a control computer
Font – The style and shape of alphanumeric text and punctuation that is displayed on the VMS matrix and is used to create messages viewed by motorists and travelers. I.e., thin vs. wide, tall vs. short, fixed width vs. variable width, "Arial" vs. "Courier" vs. "Gothic" vs. "Times New Roman", etc. Sometimes referred to as "character font"
Font File – A computer file that contains a group of fonts having the same style and shape
Frame – See page
FSORS – Full, Standardized Object Range Support – Support for, and proper implementation of, all valid

values of a DMS object as defined within the object's OBJECT-TYPE macro in the subject NTCIP standard. This is further defined in two distinct sub-requirements. (1) If the ACCESS of the object is read-write, a Management System shall be able to set the object to any valid value as defined by the SYNTAX and DESCRIPTION fields (except that the value of 'other' need not be supported when such a value is defined) and the indicated functionality shall be provided. (2) The value indicated by the object (e.g., in response to a 'get'), regardless of the ACCESS, shall reflect the current condition per the rules specified in the object's DESCRIPTION

FTP – File transfer protocol

GUI – Graphical user interface

Hold Time – The length of time that a page of information will remain displayed on the VMS once the page entry effects are complete

Hz – Hertz or cycles per second

IBM – International Business Machines Corporation

InGaAlP – Indium Gallium Aluminum Phosphide. A type of LED semiconductor. See AlInGaP

ITS – Intelligent transportation system

kA – Kilo amperes

kbps – Kilobits per second

kph – Kilometers per hour

LED – Light emitting diode

Library – A group of message files or schedule files of similar type. For example, a series of messages related to road construction can be stored under a library name of "CONSTRUCTION"

m – Meters

mA – Milliamps

mm – Millimeters

mph – Miles per hour

Management System – A computer system used to control an NTCIP field device, such as a VMS. This includes any software used for field (local) control and central (remote) control

Message – Information displayed on the VMS for the purpose of visually communicating with motorists. A VMS message can consist of one page or multiple pages that are displayed consecutively

MIB – Management information base

Modem – A communication device that allows data to be sent or received via telephone

MS – Microsoft Corporation

NEMA – National Electrical Manufacturers Association

Network – Multiple VMS, and sometimes other ITS field devices, which are connected to a single control computer. See also VMS system

nm – Nanometers

NCHRP – National Cooperative Highway Research Program

NTCIP – National Transportation Communications for ITS Protocol

NTCIP Component – A DMS or Management System

NTCIP System – A Management System plus the various ASCs and DMSs controlled by the Management System

Operator – Person using a control computer to run variable message sign(s)

Page – The maximum amount of information that can be shown on the VMS display matrix at a given moment in time

P.E. – Professional Engineer

Pixel – The smallest changeable (programmable) portion of a VMS display matrix

PC – Personal computer
PMPP – Point to multipoint communication
PPP – Point to point communication
PROM – Programmable read only memory
PSI – Pounds per square inch
PWM – Pulse width modulation
RAM – Random access memory
Response Time – The time to prepare and begin transmission of a complete response containing the requested Application Layer information. This is measured as the time from receipt of the closing flag of the request to the transmission of the opening flag of the response when the device has immediate access to transmit
RTD – Real time data
ROM – Read only memory
Schedule – A data file that predetermines when a VMS field controller will cause a stored message to be displayed on the VMS. A schedule can be set to the day, hour, and minute
Sign Status – Information that identifies current and historical data for a single VMS. This can include the VMS name, VMS field controller software version number, the calendar date and time indicated by the VMS field controller's internal clock, the last field controller reset time, internal and external sign temperatures, display matrix intensity level, the name of running messages, and other information
SRAM – Static read only memory
Stroke – The vertical and horizontal width of a display pixel. "Single stroke" denotes character segments that are one pixel wide. "Double stroke" denotes character segments that are two pixels wide
UK – United Kingdom
UL – Underwriter's Laboratories
UV – Ultraviolet light
V – Volts
VAC – Volts alternating current
VDC – Volts direct current
VMS – Variable message sign. One type of DMS
VMS Control Software – Applications software that, when residing in a control computer, is used to operate, monitor, and diagnose variable message sign(s) from either a remote location or locally using a direct connection to a single sign
VMS System – A closed-loop system that contains a central (remote) VMS control computer loaded with VMS control software, one or more variable message signs. Each VMS has its own field (local) controller and an interconnecting communications backbone
WYSIWYG – What you see is what you get. More specifically, what you see on the VMS control computer monitor is a scaled representation of how a message will appear when it is being displayed on the VMS. Similarly, after a pixel diagnostic test routine has been run, what you see on the control computer monitor is a scaled representation of the functional status of each pixel in the VMS display matrix.

VMS Display Capability

The VMS shall contain a full display matrix measuring a minimum of twenty seven (27) pixel rows high by one hundred twenty (120) pixel columns wide. The matrix shall display messages that are continuous, uniform, and unbroken in appearance to motorists and travelers.

Each display pixel shall be comprised of multiple monochrome amber LEDs. Other pixel technologies, such as fiber optic, flip disk, combination flip disk-fiber optic, combination flip disk-LED, liquid crystal, and incandescent lamp, will not be accepted. The centers of all adjacent pixels shall be spaced a maximum of 2.6 inches (66 mm) apart, both vertically and horizontally.

The pixel matrix shall be capable of displaying alphanumeric character fonts measuring a minimum of 13 inches (330 mm) tall to a maximum of the display matrix height. Initially, however, only 18-inch (460 mm) and 28.6-inch (726 mm) font files need to be provided.

The VMS shall be able to display messages composed of any combination of alphanumeric text, punctuation symbols, and graphic images.

VMS messages shall be legible within a distance range of 150 feet (45.7 meters) to 1,000 feet (305 meters) from the VMS display face under the following conditions:

- When the VMS is mounted such that its bottom side is positioned between five feet (1.5 meters) and 20 feet (6.1 meters) above the roadway surface
- Whenever the VMS is displaying alphanumeric text that is 18 inches (460 mm) tall
- 24 hours per day and in most normally encountered weather conditions
- During dawn and dusk hours when sunlight is shining directly on the display face or when the sun is directly behind (silhouetting) the VMS
- When viewed by motorists and travelers that have 20-20 corrected vision
- When motorist and travelers eye level is 3 feet (0.9 meters) to 12 feet (3.6 meters) above the roadway surface.

Display of Alphanumeric Text

For message creation, the VMS, VMS field controller, and VMS control software shall support the storage and use of a minimum of three (3) alphanumeric character fonts files. Each font file shall include the following character fonts:

- The letters "A" through "Z", in both upper and lower case
- Decimal digits "0" through "9
- A blank or space
- Eight (8) directional arrows
- Punctuation marks, such as: . , ! ? - ‘ ’ ” ”
- Other characters, such as: # & * + / ( ) [ ] < >.

During message creation, an individual character font shall be selectable with either a single computer

keystroke, such as [A], or a two-keystroke operation, such as [shift][A]. Font files shall include data that establishes the amount inter-character (horizontal) spacing.

Inter-line (vertical) spacing, which separates adjacent text lines, shall be operator selectable during message creation using the VMS control software.

The VMS shall provide a minimum of three pixel rows of vertical space between adjacent text lines, whenever multiple lines of seven-pixel high (18-inch, 460 mm) text are being displayed.

The following character font files shall be supplied with the VMS for this contract:

- 7x4 Single Stroke – a typical font is seven (7) pixel rows high by four (4) pixel columns wide, has a single-pixel stroke width, and provides one pixel column of inter-character spacing
- 7x6 Double Stroke – a typical font is seven (7) pixel rows high by six (6) pixel columns wide, has a two-pixel stroke width, and provides one pixel column of inter-character spacing
- 11x7 Double Stroke – a typical font is eleven (11) pixel rows high by seven (7) pixel columns wide, has a two-pixel stroke width, and provides two pixel columns of inter-character spacing.

Display of Graphic Images

At the present time, NTCIP does not officially support communication and display of graphic image data files. This fact notwithstanding, the VMS, VMS field controller, and VMS control software provided for this contract shall provide the ability to create and display graphic images by storing the images as font (text) files. The VMS shall be able to display messages containing graphic images of any size that will fit on its display matrix.

Message Entry Effects

The VMS shall be able to display messages using the following types of entry effects:

- Static Message – The selected message is displayed continuously on the sign face until the field controller blanks the sign or causes the display of another message
- Flashing Message – All or part of a message is displayed and blanked alternately at rates from as fast as 3 flashes per second to as slow as 1 flash per 10 seconds. The flash rate is user programmable in increments of 0.1 seconds
- Scrolling Message – The message moves across the display face from one side to the other. The direction of travel is user selectable as either left-to-right or right-to-left
- Multiple-Page Message – A message contains up to five different pages of information, with each page filling the entire pixel matrix. Each page's display time is user programmable in durations of 0.5 seconds or greater, and is adjustable in increments of 0.1 seconds.

A VMS message shall be able to utilize a combination of these effects.

VMS Control and Communications

Each VMS shall be controlled and monitored by its own field controller. The field controller shall be a stand-alone microcomputer, which does not require continuous communication with VMS control software in order to perform most VMS control functions.

The VMS field controller shall be able to receive instructions from and provide information to a computer containing VMS control software using the following communication modes:

- Remotely – Via direct, dial-up, or wireless CDPD communications with a remotely located computer. The system communications backbone, as well as all field modems or signal converters, shall provide the VMS field controller with an RS-232 signal having a baud rate between 2,400 bps and 56.6 kbps
- Locally – Via direct connection with a laptop computer that is connected directly to the field controller using a null modem connection and a baud rate between 2,400 bps and 56.6 kbps.

Diagnostic and Status Information

VMS operational status, as well as the functional status of major VMS components and VMS field controller communications, shall be reportable to VMS control software residing in both remote and local computers. This shall minimally include the following information:

- Field Controller Communications – As "Normal" or "Failed"
- Message Display Status – As {name of message being displayed} or "Blank"
- Maximum Usable Intensity Level – The maximum usable percentage of the maximum possible drive current that can be applied to the LED display matrix for intensity adjustment purposes. This shall be a user-programmable value, and it shall range from 50% to 100% of the maximum possible LED drive current, in increments of 1%
- Actual LED Intensity Level – The percentage of the "Maximum Usable Intensity Level" at which the LED display is currently operating, whether intensity control is in an automatic or manual mode
- Actual LED Intensity Level Control Method – As "Automatic" or "Manual"
- LED Pixel Status (for all pixels) – Displayed upon operator request in a bit-map graphic format as "Normal", "Failed", or "Half-Failed"
- Real-Time VMS Message Verification – Presents the exact content of the displayed message in real-time. Actual displayed message can be viewed using the VMS control software.
- Regulated DC Power Supply Output Status (for all supplies) – As "Normal" or "Failed"
- Internal VMS Temperature – The internal VMS air temperature measured by internally located sensors. This shall be reported in degrees F and C
- Ambient VMS Site Temperature – Outdoor air temperature measured by an external temperature sensor. This shall be reported in degrees F and C.

MATERIALS
General Specifications

The VMS housing shall provide walk-in service access for all LED display modules, electronics, power supplies, photo sensor assemblies, environmental control equipment, air filters, wiring, and other internal VMS components.

Dimensions – VMS housing dimensions shall not exceed ninety four (94) inches tall by three hundred fourty eight (348) inches wide. The front-to-back housing depth shall not exceed forty eight (48) inches at its widest point, including the rear ventilation hoods.

Weight – VMS weight shall not exceed 4200 pounds.

Power – Maximum AC power shall not exceed 8590 watts, when the following circuits are operational and fully loaded:

- LED display pixel matrix, with 100% of the pixels operating at their maximum possible drive current
- VMS environmental control system
- 20-amp utility outlet circuit
- VMS field controller.

Typical VMS AC operating power shall not exceed 1630 watts, with the following circuit loadings:

LED display pixel matrix, with 25% of the pixels operating at their maximum possible drive current
VMS field controller.

VMS shall operate from 120 VAC, 60 Hz single-phase, including neutral and earth ground

The VMS housing shall be constructed to have a neat, professional appearance. The housing shall protect internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure Type 3R standards, as described in NEMA Standards Publication 250-1997, Enclosures for Electrical Equipment (1000 Volts Maximum). The VMS housing bottom side shall contain small weep holes for draining any water that accumulates due to condensation.

Weep holes and ventilation/exhaust hoods shall be screened to prevent the entrance of insects and small animals.

VMS and field controller components shall operate in a minimum temperature range of -40 to +140 °F and a relative humidity range of 0 to 99%. VMS and field controller components shall not be damaged by temporary exposure to temperatures of -50 to +185 °F.

Internal VMS component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from stainless steel, aluminum, nylon, or other durable corrosion-resistant materials suitable for the roadway signage application.

No internal electrical wiring or internal electrical components of any type (fans, power supplies,

transformers, LED display modules, circuit boards, surge suppression devices, fuses, relays, power and signal termination panels, utility outlets, and other electrical components) shall be located within four inches (100 mm) of the VMS housing floor. This will prevent short circuits from occurring, in the event of internal water buildup. The only allowable exception to this requirement shall be the bottom-facing photo sensor assembly, which shall be insulated to prevent water-related short circuits.

Electrical VMS and field controller components shall be 100% solid-state, except for the environmental control fans. All high voltage electrical components (exceeding 24 VDC) used in the VMS and the field controller shall be UL (Underwriter's Laboratory) listed.

The presence of ambient radio signals and magnetic or electromagnetic interference, including those from power lines, transformers, and motors, shall not impair performance of the VMS system. The VMS system shall not radiate electromagnetic signals that adversely affect any other electronic device, including those located in vehicles passing underneath or otherwise near the VMS and its field controller.

VMS Housing Frame and Mounting Brackets

VMS housing right, left, and rear walls shall be vertical. Top and bottom sides shall be horizontal. The front VMS wall shall be built with a permanent forward tilt angle of three (3) degrees, so that the top of the VMS housing is deeper than its bottom. LED display modules shall be mounted parallel to the front wall, so they are tilted three degrees forward toward the viewing motorists and use of the legible LED viewing cone is optimized.

The VMS housing structural frame shall consist of aluminum extrusions made from alloy number 6061-T6. All sides of the VMS housing exterior, except the front, shall be covered with 0.125-inch (3.17 mm) thick aluminum sheets made from alloy number 5052-H34. The interior side of each sheet shall be stitch-welded to the VMS frame members. All exterior sheet seams shall be continuously seam welded to the VMS frame, in order to form a unitized structure.

The VMS housing shall be fabricated, welded, and inspected in accordance with the requirements of ANSI/AWS D1.2-97 Structural Welding Code-Aluminum (1997). Compliance with this standard shall include, but shall not be limited to, the following:

- Welding shall be performed according to documented in-house welding procedures
- Personnel who perform welding on the VMS housing shall be certified to AWS D1.2-97 for all weld types required for housing fabrication
- A Certified Welding Inspector (CWI) shall inspect VMS welding on a daily basis and shall complete written reports that document welding progress, weld integrity, and any corrective action taken. The VMS manufacturer shall archive these reports and make them available for review, upon request of the Engineer.

Multiple mounting brackets in the form of I-beams or Z-extrusions shall be bolted to the VMS housing exterior rear wall, to facilitate attachment of the VMS to its support structure. Mounting brackets shall be:

- Extruded from aluminum alloy number 6061-T6

- Attached to the VMS structural frame members, not just the exterior sheet metal
- Installed at the VMS manufacturer's factory
- Attached to the VMS using galvanized A105 grade high-strength steel bolts
- Attached to the VMS using direct tension indicators to verify that mounting hardware is tightened with the proper amount of force
- Installed such that all bracket-to-VMS attachment points are sealed and water-tight
- Designed and fabricated such that the installing contractor can drill into them without penetrating the VMS housing and compromising the housing's ability to shed water.

For moving and installation purposes, multiple steel lifting eyebolts shall be attached to the top of the VMS housing. Eyebolts shall attach directly to the VMS housing structural frame and shall be installed at the VMS factory. All eyebolt mounting points shall be sealed to prevent water from entering the VMS housing. Lifting eyebolts, as well as the housing frame, shall be designed so that the VMS can be shipped and handled without damage or undue stress being applied to the housing prior to or during VMS installation on its support structure.

All lifting eyebolts shall be removed from the VMS after installation on its support structure. Bolt holes shall be plugged and sealed to prevent water from entering the VMS housing.

VMS structural assembly hardware and mounting brackets hardware (nuts, bolts, washers, and direct tension indicators) shall be stainless steel or galvanized high-strength steel and shall be appropriately sized for the application.

Front Face Construction

The VMS front face shall be constructed with multiple rigid panels, each of which supports and protects a full-height section of the LED display matrix. Panel exteriors shall be fabricated from 0.090-inch (2.28 mm) or thicker aluminum sheeting, and panel interiors shall be 0.125-inch (3.17 mm) or thicker polycarbonate sheeting. Face panels shall be bolted to the VMS housing and to each other using stainless steel hardware. Seams that separate adjacent panels shall be sealed. Panels shall be removable and shall not be welded to the VMS housing. The weight of a single face panel shall not exceed 150 pounds (68.2 kg).

Front face panels shall provide a high-contrast background for the VMS display matrix. The aluminum portion of each panel shall be painted black and shall contain a circular or square opening for each LED pixel. Openings shall be large enough to not block any portion of the LED viewing angle.

Polycarbonate sheets shall be securely attached to the inside of the aluminum panels and shall cover the pixel openings. The polycarbonate shall be sealed to prevent water and other elements from entering the VMS. Polycarbonate shall contain UV light inhibitor, which protects the LED display matrix from the effects of ultraviolet light exposure and prevents premature aging of the polycarbonate itself. Polycarbonate sheets shall have the following characteristics:

- Tensile Strength, Ultimate: 500 PSI
- Tensile Strength, Yield: 8,400 PSI
- Elongation Before Rupture: 100%

- Tensile Modulus: 340,000 PSI
- Flexural Strength: 13,500 PSI
- Flexural Modulus: 340,000 PSI
- Compressive Strength (0.05"/minute): 12,500 PSI
- Impact Strength, Izod (1/8", notched): 16 ft-lbs/inch of notch
- Rockwell Hardness: M70, R118
- Shear Strength: 5,800 PSI
- Heat Deflection Temperature Under Load: 264 PSI at 260F and 66 PSI at 280F
- Coefficient of Thermal Expansion: 3.75X10-5 in/in/F
- Specific Heat: 0.30 BTU/lb/F
- Water Absorption (24 hours at 73° F): 0.15%
- UL94 Flame Rating: 94V2
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%.

LED display modules shall mount to the inside of the VMS front face panels using either standard hand tools or no tools for removal and replacement.

VMS front face borders (top, bottom, left side, and right side), which surround the front face panels and LED display matrix, shall be painted black to maximize display contrast and legibility.

In the presence of wind, the VMS front face shall not distort in a manner that adversely affects LED message legibility.

Exterior Finish

VMS front face panels and front face border pieces shall be coated with semi-gloss black Kynar 500 resin or an equivalent brand of oven-fired fluoropolymer coating, which has an expected outdoor service life of 20 years.

All other VMS housing surfaces, including the access doors and VMS mounting brackets, shall be natural mill-finish aluminum.

VMS Housing Structural Certification

A Professional Engineer registered in the State of Kentucky shall analyze the VMS structural design and shall certify that the VMS:

- Will withstand the temporary effects of being lifted by the lifting eyebolts provided
- Will withstand a wind velocity of 100 mph (160 kph), with a 30 percent gust factor
- Will support a front face ice load of 4 pounds per square foot (19.5 kg/square meter)
- Complies with the applicable requirements of AASHTO Standard Specifications for Structural Supports

for Highway Signs, Luminaires and Traffic Signals, Third Draft, March 1999
- Complies with the fatigue resistance requirements of NCHRP Report 412, Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports.

The Professional Engineer shall analyze the complete VMS structural design. This includes the housing, mounting brackets, and lifting eyebolts, as well as the bracket-to-housing mounting hardware (nuts, bolts, washers, direct tension indicators, etc.) provided by the VMS manufacturer. Analysis shall include, but shall not be limited to:

- The quantity and type of lifting eyebolts to be provided
- The quantity and type of mounting brackets to be provided
- The quantity and type of hardware (nuts, bolts, washers) used to attach the mounting brackets to the VMS
- Verification that no dissimilar metals problem will exist and/or affect the structural integrity of the VMS-to-bracket attachment points
- A recommendation of the number of attachment points, as well as the attachment locations, that the installing contractor should use when mounting the VMS to its support structure.
- Verification of the catwalk and door to provide proper operation.

The VMS manufacturer shall include a signed and sealed copy of this P.E. certification, including all supporting calculations, with the pre-build technical submittal.

Serviceability

The VMS housing shall provide safe and convenient walk-in service access for all modular assemblies, components, wiring, and other materials located within the VMS housing, excluding front face panels, external mounting brackets, and VMS support structure members. All internal components shall be removable and replaceable by a single technician.

The minimum distance from the interior rear wall to the closest display component shall be 36 inches (920 mm). Minimum headroom of 72 inches (1,828 mm) shall also be provided. This free space shall be maintained across the entire length of the VMS housing, with the exception of structural frame members. However, structural members shall be designed to not obstruct the free movement of maintenance personnel throughout the VMS interior.

A level walkway shall be installed in the bottom of the VMS housing. The walkway shall be a minimum of 24 inches (609 mm) wide, and it shall run the entire length of the housing, from access door to access door. The walkway's top surface shall be non-slip and shall be free of obstructions that would trip service personnel. The walkway shall support a load of 300 pounds (136 kg) per linear foot, and it shall be constructed of multiple, removable panels.

The VMS housing shall contain a 20-Amp utility outlet circuit consisting of a minimum of three (3) NEMA 20-R, 120 VAC duplex outlets, with ground-fault circuit interrupters. One outlet shall be located near each end of VMS housing interior, and the third outlet shall be located near the housing's center.

The VMS housing shall contain a minimum of one (1) 4-foot (1,200 mm), 40-watt fluorescent lamp fixture for every five feet (1,520 mm) of VMS housing length. Lamps shall be evenly spaced across the housing ceiling, so they provide uniform light distribution for maintenance purposes. Lamps shall be protected by wire cages. Lamp ballasts shall be rated for operation at 0 degrees F (-17 C). Lamp circuits shall be controlled by a manual timer switch having an adjustable on time of two (2) hours. One light switch shall be located within easy reach of each access door.

One (1) vertically hinged door shall be located on each end (left and right side) of the VMS housing. Each access door shall be mounted to an integral doorframe, which bolts to the VMS housing using stainless steel hardware. A continuous vertical stainless steel hinge shall support each door, and all doors shall open outward. In the closed position, each door shall latch to its frame with a three-point draw-roller mechanism. The latching mechanism shall include an internal handle and release lever. Door release levers shall be located so that a person with no key and no tools cannot become trapped inside the housing.

Doorframes shall be double flanged on all sides so they shed water. Each door shall close around its flanged frame and compress against a closed-cell foam gasket, which adheres to the door. All doors shall contain a stop that retains the door in a 90-degree open position. When a door is open, the door and its stop shall not be damaged by a 40 mph (64 kph) wind.

Each door shall be furnished with a lock that is keyed to #2 Corbin key to match the existing ARTIMIS VMS keys.

The VMS shall be equipped with a removable safety rail assembly, which prevents service personnel from falling out of the VMS when placed across an open access door. The rail assembly shall be designed to fit on either access door. The safety rail shall be a single-piece assembly that extends 48 inches (1,219 mm) above the interior walkway and contains multiple horizontal rails that are no more than 12 inches (305 mm) apart. The rail assembly shall attach to the VMS using stainless steel hardware that requires simple or no tools for removal and replacement.

LED Display Modules

The VMS shall contain seventy two (72) 9-pixel high by 5-pixel wide LED display modules, which are placed side-by-side to form a continuous full LED pixel matrix. Modules shall be mounted to the inside of the VMS front face panels using hardware that requires either basic hand tools or no tools for removal and replacement. Each 9x5 display module shall be constructed as follows:

One or more LED pixel circuit board(s) shall be mounted to the back of an aluminum panel to form the 9-pixel high by 5-pixel wide module. Pixel boards shall be mounted to the aluminum panel with durable, non-corrosive hardware, and their removal from the panel shall not require the use of tools.
The aluminum module panel shall have a minimum thickness of 0.063 inches (1.6 mm) and shall contain a circular opening for each LED pixel. The openings shall be sized so they do not block any portion of the LED viewing cone.
The front side of the aluminum module panel, which faces the viewing motorists, shall be primed and coated with automotive-grade flat black acrylic enamel paint.
One (1) LED driver circuit board shall be mounted to the back of each display module using durable non-

corrosive hardware; the driver board shall require either basic hand tools or no tools for removal and replacement.
LED display module electrical and signal connections shall be the quick-disconnect locking connector type. Removal of a 9x5 display module from the VMS, or a pixel board or driver circuit board from its display module, shall not require a soldering operation.
It shall not be possible to mount a display module upside-down or in an otherwise incorrect position within the VMS display matrix.
All 9x5 LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the VMS.

Removal of a single 9x5 display module from the VMS, or failure of a single module, shall not affect the performance of any other module in the sign. Removal of one or more modules shall not affect VMS structural integrity or the structural integrity of the rest of the LED display matrix.

LED Pixel Boards

Each 9x5 display module shall contain one or more printed circuit boards, to which multiple LED pixels are soldered. Each pixel board shall contain a minimum of five (5) and a maximum of forty-five (45) LED pixels. Each pixel shall contain a circular grouping of six (6) or more discrete LEDs.

LED pixel boards shall conform to the following specifications:

- The distance from the center of one pixel to the center of all adjacent pixels, both horizontally and vertically, shall be 2.6 inches (66 mm)
- Each pixel shall consist of one or more strings of discrete LEDs, and each LED string shall be in series with its own current limiting resistor
- Current limiting resistors shall be rated to prevent LED forward current from exceeding 30 mA whenever a forward voltage is applied. LED drive currents greater than 30 mA will not be allowed, in order to maximize LED service life
- The failure of an LED string shall not cause a change in the forward current of any other LED string in the VMS
- The failure of an LED string shall not cause the failure of any other LED string or pixel in the VMS, and failure of a pixel shall not cause the failure of any other pixel in the VMS
- Each pixel string shall contain an identical quantity of LED's
- Pixels shall contain the quantity of discrete LED's needed to generate a pixel luminous intensity of 40 Cd, minimum, when the pixel is driven with a forward current of 20 mA DC per LED string
- LED pixel forward voltage drop, measured from the DC power supply output to ground, shall not exceed 24 VDC. This includes the drive circuit voltage drop and any internal DC line loss
- LED pixel power shall not exceed 0.75 watts
- Discrete LEDs shall be soldered so that the base of their lenses are flush with and perpendicular to their printed circuit board
- Each pixel shall be protected from handling damage by a polycarbonate plastic ring or similar non-conductive device that clips into the printed circuit board and surrounds the LEDs. The protective device shall contain UV light inhibitor
- Printed circuit board laminate shall be FR-4 fiberglass and shall have a minimum thickness of 0.062

inches (1.6 mm). The printed circuit board shall be plated on both sides with a copper trace thickness of two ounces per square foot of plated area. Printed circuit board through-holes shall be plated with one ounce of copper per square foot of plated area

- The printed circuit board through-hole for each LED cathode lead shall be connected to a large copper trace pad that has a minimum surface area of 0.04 square inches (5 square mm). For each LED in the pixel, one trace pad shall present on both the front and back of the pixel circuit board. Trace pads shall dissipate heat from the LEDs, thereby maximizing LED service life
- All exposed metal on both sides of the LED pixel board, except the power connector, shall be protected from water and humidity exposure by a thorough application of acrylic conformal coating. Bench level repair of individual pixels, including discrete LED replacement and conformal coating repair, shall be possible
- The VMS field controller shall be able to measure the forward current of each LED pixel and determine if the pixel is operating normally. This information shall be reportable to a system control computer upon command from the VMS control software
- All LED pixel boards shall be identical and interchangeable throughout the VMS.

Discrete LEDs

VMS pixels shall be constructed with discrete LEDs manufactured by the Toshiba Corporation or Agilent Technologies (formerly known as Hewlett-Packard). Substitutes will not be accepted. Discrete LEDs shall conform to the following specifications:

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize InGaAlP or AlInGaP semiconductor technology
- LED lenses shall be fabricated from UV light resistant epoxy
- The LED lens diameter shall be 5 mm (0.2 inches). This is sometimes referred to as a T 1-3/4 style LED package
- LEDs shall emit amber (yellow-orange) light that has a peak wavelength of 590 (4 nm. Color shorting shall be performed by the LED manufacturer
- LEDs shall be obtained from a one-bin luminous intensity sort. A bin is defined such that, when all LEDs from a given bin are driven with an identical forward current, the dimmest LED in the bin emits no less than half the luminous intensity of the brightest LED in the bin. Intensity shorting shall be performed by the LED manufacturer
- LEDs shall have a minimum half-power viewing angle of 15° . Half-power viewing angle is defined such that, at a given distance from the LED, luminous intensity measured at any point at an angle of 7.5° from the LED's center axis is no less than half the luminous intensity measured directly on the LED's center axis
- LED package style shall be through-hole flush-mount; LED's with standoffs and surface mount LED's will not be accepted
- All LED's used in all VMS provided for this contract shall be from the same manufacturer and of the same part number.

Pixel Drive Circuitry

LED pixels shall be directly driven using pulse width modulation of a 30-mA forward current. This drive method varies the current pulse width in order to achieve the proper display intensity level for a given ambient light condition. The drive current pulse shall be modulated from a 10-millisecond period, and pulse amplitude shall not be allowed to exceed 30 mA per LED string. For example, the maximum current draw for a single two-string pixel shall not exceed 60 mA.

One (1) electronic driver circuit board shall be provided for each 9-pixel high by 5-pixel wide (9x5) LED display module and shall individually control all 45 pixels on that module. Driver circuitry and LED pixels shall not be mounted on the same printed circuit board.

Driver circuit boards shall conform to the following:

- Driver printed circuit board laminate shall be FR-4 fiberglass and shall have a thickness of 0.062 inches (1.6 mm). The printed circuit board shall be plated on both sides with a copper trace thickness of two ounces per square foot of plated area. Printed circuit board through-holes shall be plated with one ounce of copper per square foot of plated area
- A diagnostic indicator shall be included on each LED driver circuit board. This diagnostic indicator shall be in the form of a single-digit LED display approximately 0.7 inches or greater in height. This digit shall provide visual indication of the operational status of the LED module. At a minimum, this shall indicate failed pixel, improper supply voltage, and failed communications conditions.
- All exposed metal on both sides of the LED driver circuit board, except power and signal connectors, shall be protected from water and humidity exposure by a thorough application of acrylic conformal coating
- LED drive circuitry shall support a minimum refresh rate of 100 frames per second
- All driver circuit boards shall be identical and interchangeable throughout the VMS
- Removal or failure of a single driver circuit board shall not affect the performance of any LED display module in the VMS, except the 9x5 module that it drives.

Regulated DC Power Supplies

The LED pixel display matrix shall be powered with regulated switching DC power supplies that operate from 120 VAC/60 Hz input power and have an output of no more than 24 VDC. Power supplies shall:

- Protect the LED pixel matrix and driver circuitry in the event of power spikes or surges
- Maintain the appropriate LED display intensity in the event of a brownout (low power) condition.

Power supplies shall be wired in a redundant parallel configuration that uses multiple supplies for each section of the VMS display matrix. Supply outputs shall be tied together, and each group of supplies shall have a "current sharing" ability, which allows them to provide equal amounts of current to their display section. Current sharing shall be independent of the LED pixel quantity that is powered at any given time.

Power supplies shall be rated such that if one supply fails, the remaining supplies in the group shall be able to operate their display section under full load conditions (all pixels on at maximum drive current) and when the internal VMS air temperature is +140° F.

Regulated DC power supplies shall conform to the following specifications:

- Maximum output power rating of 500 watts
- Operating input voltage range: +90 to +250 VAC
- Operating temperature range: -40 to +140° F (-40 to +60° C)
- Power supply output at an ambient temperature of +140° F: minimum of 65% of the supply's room temperature (+72° F / +22° C) output
- Power supply efficiency: 70%, minimum
- Power factor rating: 0.95, minimum
- Short circuit protection: DC power off, with an automatic reset after 5 seconds of AC power off
- Minimum overload allowance protection: 105%
- UL listed.

Power supplies shall be identical and interchangeable throughout the VMS.

The VMS field controller shall be able to monitor power supply operational status (as "normal" or "failed") by reading a diagnostic signal located on each supply's DC output. The operational status of all power supplies shall be reportable to the VMS control software.

Interior VMS Environment Control

The interior VMS environment shall be regulated by two systems.

Housing Exhaust System – The VMS shall contain a ventilation system that exhausts air out of the housing whenever the internal VMS air temperature exceeds +100° F (+38° C). This system shall be designed to keep the internal VMS air temperature lower than +140° F (+60° C), when the outdoor ambient temperature is +115° F (+46° C) or less.

The exhaust system shall consist of enough 550-cfm fans to exchange the internal VMS air volume at a minimum rate of 5 times per minute. Fans shall be the ball-bearing type and shall be mounted on the top end of the rear VMS wall. Fans shall exhaust air out of the cabinet. No fewer than two (2) fans shall be installed.

One filtered air intake port shall be provided for each exhaust fan. Intake ports shall be located on the bottom end of the rear VMS wall. Each intake port shall be covered with a filter that removes airborne particles measuring 500 microns in diameter and larger.

Fans and air filters shall be removable and replaceable from inside the VMS housing.

Each air intake and exhaust port shall be covered on its top, front, and sides by an aluminum hood that is riveted to the rear VMS wall. Exhausted air shall pass through an opening on the bottom of each hood, and openings shall be screened to prevent the entrance of insects and small animals. Hoods shall be fabricated from 0.090-inch (2.2 mm) or thicker aluminum sheeting. All hood-to-housing contact edges shall be thoroughly sealed to prevent water from entering the VMS.

A thermostat shall be located near the top of the VMS interior, and it shall automatically activate the housing exhaust system whenever the internal VMS air temperature exceeds +100° F (+37° C).

In addition to automatic control by a thermostat, the VMS exhaust system shall also be controllable by a manual timer switch located just inside one of the access doors. The switch shall be adjustable up to four (4) hours.

Front Face Panel Defog/Defrost System – The VMS shall contain a defog/defrost system that warms the VMS front face whenever the internal VMS air temperature falls below +40° F (+4° C). The purpose of this system shall be to keep the front face polycarbonate panels free of frost and condensation, which can hinder VMS legibility.

A thermostat shall automatically activate the front face panel defog/defrost system, which shall not be hot enough to damage the polycarbonate panels.

Ambient Light and Temperature Measurement System

Sensors that measure outdoor ambient light levels at the VMS site, as well as the outdoor ambient temperature, shall be mounted in-line with the VMS housing walls. This system shall consist of three (3) commercially available photoelectric sensors and one (1) temperature sensor.

Two of the photo sensors shall be placed such that they measure the ambient light levels striking the front and rear VMS housing walls. The third photo sensor shall be mounted to the VMS housing bottom and shall face the ground. A change in the amount of light striking a photo sensor shall cause its output frequency to vary. The VMS field controller shall continuously monitor sensor outputs and use the information to automatically adjust LED display matrix intensity to a level that creates a legible VMS message.

An ambient temperature sensor shall be mounted to either the rear wall or bottom side of the VMS housing. The sensor shall be placed such that it is never in direct contact with sunlight or is in any location that will generate a false temperature measurement. Temperature sensor output shall be continuously monitored by the VMS field controller and shall be reportable to the VMS control software.

Internal Temperature Measurement System

The VMS shall contain a minimum of two (2) temperature sensors that are mounted in the top of the VMS interior. Sensors shall be able to measure a minimum temperature range of +40° F (+4° C), and sensor output shall be reportable to the VMS field controller.

Internal Wiring

Wiring for LED display module control, environmental control circuits, and other internal VMS components shall be installed in the VMS housing in a neat and professional manner. Wiring shall not impede the removal of display modules, power supplies, environmental control equipment, and other sign components.

Wires shall not make contact with or be bent around sharp metals edges. LED display module power and signal wiring shall be cut to a length and installed such that it is not possible to connect a module to the wrong set of wires. All wiring shall conform to the National Electric Code.

Power and Signal Entrances

Two threaded conduit hubs shall be located on the rear wall of the VMS housing. One hub shall be for incoming AC power, and the other shall be for incoming VMS signal cabling or a communications line.

Transient Protection

VMS and field controller signal and power inputs shall be protected from electrical spikes and transients, as follows:

VMS Site AC Power – The AC power feed for all equipment shall be protected at the load center by a parallel-connection surge suppresser rated for a minimum surge of 10kA.

AC Power for VMS Control Equipment – A series-connected surge suppresser capable of passing 15 Amps of current shall protect the field controller and modem (or signal converter). This device shall conform to the following requirements:

- Withstand a peak 20,000 ampere surge current for an 8 X 20 microsecond wave form
- 20 minimum peak surge occurrences
- Clamp at 20,000 amperes: 340 V, maximum
- Maximum continuous operating current of 15 amps at 120 VAC, 60 Hz
- Series inductance of 200 microhenrys (nominal)
- Temperature range of –40 to +176° F (-40 to +80° C)
- Approximate dimensions of 3 inches wide by 5 inches long by 2 inches high (76 by 127 by 50 mm)
- The device shall be UL 1149 recognized.

Driver Circuit Communications – RS-485 communication lines between the field controller and the LED driver circuit boards shall be protected by avalanche diodes rated for 11.5 Volts at 10 Amps, and 14 Volts at 70 Amps.

Field Controller Communications – RS-232 and RS-485 communication ports in the VMS field controller shall be protected by avalanche diodes connected between each signal line and ground. This shall include data inputs from the photo sensors and temperature sensor

Telephone Communications – A series/parallel two-stage suppression device that provides a 200-Volt clamp shall protect the incoming telephone communication line.

Earth Grounding

The VMS manufacturer shall provide two earth ground lugs, which are electrically bonded to the VMS housing. Lugs shall be installed near the lower left and lower right corners of the VMS housing's rear wall. The VMS installation contractor shall provide the balance of materials and services needed to properly earth ground the VMS.

Specifications VMS Field Controller

Field Controller Hardware

General Specifications

A field controller shall be provided with each VMS. The controller shall:

- Be a stand-alone microprocessor-based computer that runs on an embedded operating system
- Be housed within its own durable environmentally-resistant enclosure
- Mount to a standard EIA 19-inch (482 mm) equipment rack
- Have a maximum weight of 20 pounds, including its enclosure
- Operate throughout a temperature range of -40 to +176° F (-40 to +80° C) and a humidity range of 0 to 99%, without the assistance of an auxiliary heater
- Require an RS-232 communications signal having a baud rate between 2,400 bps and 56.6 kbps
- Be fully compliant with NTCIP standards specified herein
- Be fully compliant with the NTCIP Class B (PMPP) communications profile specified herein
- Be fully compliant with the draft NTCIP Class D dial-up (PPP) communications profile, as specified herein
- Support all of the control, monitoring, and diagnostic features described in the VMS specification and the VMS control software specification
- Be individually addressable, so that it does not respond to commands intended for other field controllers
- Perform most VMS control and monitoring functions specified herein, without continuous communications with the system central computer.

Field controller hardware and software shall permit communication with the VMS system central computer in either of the following modes:

- Polled Operation – in which the field controller informs the central computer of its current status, in response to a periodic automatic query from the central computer
- Event-Driven Operation – in which the field controller responds to operator-initiated queries from the central computer.

The field controller shall be mounted in the model 334 enclosure shown on the plan sheets.

Controller ID

An 8-bit identification code shall be assignable to each field controller, via switches located inside the controller enclosure.

Memory

The field controller shall have both permanent and changeable memory. Permanent memory shall be in the form of flash-PROM integrated circuits that contain the executable field controller software. If new versions of executable code become available, it shall be possible to upgrade the field controller with the latest version.

Changeable memory shall be in the form of RAM integrated circuits. RAM circuits shall be backed-up by a lithium battery and shall retain their data memory for a minimum of one (1) year following a power failure. RAM memory shall be used for storage of message libraries, the message display schedule and programmable operating parameters.

Data Transmission Requirements

Each field controller shall contain a minimum of two EIA/TIA-232E communication ports:

One shall be for remote communications via dial-up modem (PPP) or direct (PMPP) connection (e.g. fiber optic) with the system control computer
One shall be for local, direct communication with a laptop computer.

Both ports shall be capable of operation at baud rates of 2400, 9600, 14,400, 19,200, 28,800, and 56,600 bits per second. The exact baud rate used shall be user selectable.

Internal Clock

The VMS field controller shall contain a computer-readable time-of-year clock that has a lithium battery backup. The battery shall keep the clock operating properly for at least 10 years without external power, and the clock shall automatically adjust for daylight savings time and leap year using hardware or software, or a combination of both. The clock shall be set by the field controller microprocessor and shall be accurate to within one (1) minute per month.

Year 2000 and Leap Year Compliance

VMS field controller functions shall not be impaired as a result of the transition to, or during, the year 2000 or any leap year.

Field Controller Software

Message Presentation on the VMS Display Matrix

The VMS field controller shall instruct the LED display driver circuitry in a manner that causes the desired message to appear on the VMS display matrix. At a minimum, the field controller shall support the following features, as described in the VMS specification:

- Display of alphanumeric character fonts and graphic pictures
- Message format details such as centering text on a display line, right justification, left justification, and legible spacing of letters and words
- Selection of a particular character font style
- Display of static messages
- Flashing of all or part of a message
- Message scrolling
- Alternating between pages of a multiple-page message.
- Enable the VMS Central Control operator to verify actual message displayed in a WYSIWYG format without disrupting the message displayed on the VMS.

Message and Schedule Functions

The VMS field controller shall support the following message selection functions, which may be initiated by a VMS control software operator:

- Cause the field controller to implement a message or message schedule stored in its memory
- Cause the field controller to implement a new message or schedule entered via the control software
- Edit or completely replace a message or message schedule stored in the field controller memory
- Cause the field controller to report the contents of any message or message schedule stored in its memory
- Override a scheduled message.

The field controller shall be able to implement a message stored in its memory, at a particular time and date, as supported by a message schedule feature.

Field controller software shall incorporate a fail-safe procedure to check the content of messages received and shall not change a message stored in memory, the message currently displayed on the sign, the schedule stored in memory, or the current controller clock time unless the new message is correctly received.

A displayed message shall remain on the sign until the controller receives a command to change the message or blank the sign, or a schedule stored in the field controller memory indicates that it is time to implement a different message. It shall possible to confer a "priority" status onto any message, and a command to display a priority message shall cause any non-priority message to be overwritten.

VMS Intensity Control

The VMS field controller shall be able to automatically adjust the LED display matrix intensity. A system operator shall be able to override the automatic system, in order to manually change the LED intensity.

The intensity control system shall employ photoelectric sensors, as described in the VMS specification. When the system is running in the automatic mode, the field controller shall continuously analyze ambient light levels and shall automatically adjust LED display intensity, in order to provide optimum message legibility for the given ambient light condition. Intensity control shall be achieved using pulse width modulation of the LED forward drive current, as described in the VMS specification.

The VMS intensity control system shall:

- Utilize three (3) photoelectric sensors, which are provided and installed as described in the VMS specification
- Select from a minimum of sixteen LED intensity levels. Threshold point for each intensity level shall be user programmable using the VMS control software. LED intensity levels shall be available in a range of 1% to 100% of the maximum display intensity, and in increments of 1%
- Not cause any flickering of the LED display matrix
- Allow manual and automatic intensity control modes to be user selectable using the VMS control software, although the typical control mode shall be "automatic"
- Allow manual intensity control from both local and remote locations.

LED Diagnostic Test Capability

Upon command from either a remote computer or a locally connected maintenance computer running VMS control software, the VMS field controller shall test the electrical operation of all LED pixels and determine whether their functional status is: "ok.", "failed", or "half-failed" (for two-string pixels). Pixel status shall be determined via A/D conversion of the LED pixel forward current, and the resulting data shall be communicated to the VMS control software.

LED pixel diagnostic data shall be displayable to a system operator as described in the VMS control software specification.

Real-Time VMS Message Verification

The VMS field controller and LED module hardware shall be capable of enabling the VMS Central Control operator to verify the actual message displayed on the VMS on a real-time basis. This message verification shall be presented in a WYSIWYG format without disrupting the message displayed on the VMS.

This shall be accomplished each time the VMS polled for status by the central control software. A graphical user interface (GUI) capable of displaying this type of information must be present in the central VMS control software.

Power Supply Diagnostic Test Capability

The field controller shall be able to determine the functional status of regulated DC power supplies located in the VMS, by monitoring diagnostic outputs located on the supplies. This information shall be reportable as "ok" or "failed" to the VMS control software.

Response to Errors

In the event of a communication error between the VMS field controller and the system control computer, the "communications loss message" will be displayed. This shall be factory set to blank the VMS.

In the event of a power failure, the "power recovery message" will be displayed. This shall be factory set to blank the VMS.

The VMS field controller shall contain a hardware watchdog that automatically resets the controller's microprocessor in the event of a controller lock-up.

INSTALLATION

Sign shall be installed in accordance with the sign and truss manufacturer's specifications. The Contractor shall be responsible for coordinating with the sign and supporting truss manufacturer to resolve mechanical compatibility problems prior to fabrication of either item.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Variable Message Sign shall be paid for per unit each. This item includes conduit and wiring on supporting structure. This item includes all costs for the manufacturer field engineer to perform on-site testing and setup. This item includes all costs for engineering analysis required in the VMS specifications.

SPECIFICATIONS FOR MODEL 334 ENCLOSURE

DESCRIPTION

Enclosure shall be a double door, base mounted, Caltrans traffic style enclosure with 19" equipment rack. Enclosure shall be installed on a concrete pad.

MATERIALS

Specifications for enclosure shall be "Traffic Signal Control Equipment Specifications." California Department of Transportation, January 1989, or latest edition.

Enclosure shall be model 334 and shall be equipped with 19" rack, power distribution assembly, fan and door activated light. Enclosure shall be constructed of aluminum and shall be unpainted. Cabinets shall be keyed to match the existing model 334 ARTIMIS enclosures.

INSTALLATION

Model 334 enclosure shall be installed in accordance with the plans and specifications. The Contractor shall stake all proposed enclosure locations before excavation. Enclosures located behind guardrail shall have a minimum 4' spacing from edge of pole to face of guardrail, otherwise enclosures shall be located a minimum of 30' from all driving lanes. The Contractor shall obtain approval of staked locations before excavation. The KYTC Division of Operations, ITS Branch will approve locations for all field devices. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with the Cabinet. KYTC approval of field device location does not relieve the contractor from his responsibility to repair any damage to infrastructure. All materials shall be installed in a neat and professional manner. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Model 334 enclosure will be measured for payment per unit each, complete and in place. This item includes all excavation including any special equipment required to install the enclosure foundation in rock. This item includes concrete, anchor bolts, reinforcing steel, and conduit within base.

SPECIFICATIONS FOR TRANSFORMERS

DESCRIPTION
Transformer shall be installed where indicated on the plans.

MATERIALS
Transformers used at camera and detector locations shall be 3 KVA, dry type, 480 VAC to 120 VAC step down units. Transformers used at VMS locations shall be 7 KVA, dry type, 480 VAC to 120 VAC step down units. Transformer shall be a weatherproof design for mounting without a separate enclosure.

INSTALLATION
Transformer shall be mounted to the side of the Model 334 enclosure or on a wood pole as indicated in the plans. The Contractor shall be responsible for fabricating and installing cabinet reinforcement plates required when mounting to the side of a cabinet.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
The transformer will be measured for payment per unit each, complete and in place. This item includes all related wiring, connectors, conduits, fittings, hardware, special brackets and all other incidentals necessary to provide a functional unit.

SPECIFICATIONS FOR JUNCTION BOX

DESCRIPTION
Junction box shall be a pre-cast fiber reinforced concrete box with open bottom.

MATERIALS
Junction Box Type B shall be Strongwell/Quazite PC1118BA18 with PC1118CA00 cover or approved equal.

INSTALLATION
Junction boxes shall be installed in accordance with the plans and specifications. Junction boxes shall have a minimum of 6" of 57 gravel underneath the box for drainage. Junction boxes used as pull boxes along a conduit run shall be spaced no more than 200' apart. Junction boxes shall not be placed in areas where standing water may accumulate. Junction box covers shall be flush with the finished surface. All materials shall be installed in a neat and professional manner. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
The junction box will be measured for payment per unit each, complete and in place.

SPECIFICATIONS FOR TELEPHONE SERVICE

DESCRIPTION
Telephone service shall consist of a voice grade, two line service installed at the location shown on the plans.

MATERIALS
No materials are required.

INSTALLATION
The Contractor shall be responsible for coordinating with the local phone company as to exact placement of the service pole before any excavation begins. The Contractor shall determine the nearest existing phone number as well as compile a detailed description of the pole location. This information shall be provided to the Engineer so that telephone service may be ordered. The KYTC will order the phone service and pay the monthly phone bills during and after construction. The Contractor shall be responsible for paying for the first phone bill as well as all charges related to the installation and setup of the new phone service. Payment shall be made directly to the phone company with a record of the payment given to the Engineer. These charges include costs to extend a phone line, fees associated with establishment of a new phone service, and long distance charges incurred during the setup and testing of field devices.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Telephone service will be measured for payment per unit each. Payment shall made after the service is operational.

SPECIFICATIONS FOR TELEPHONE CABLE

DESCRIPTION
Telephone cable shall originate at the telephone subscriber interface and terminate at the field device.

MATERIALS
Unless otherwise specified, telephone cable shall be 19 AWG REA spec PE-39 6 pair. Cable shall be rubber filled with Belden flexgel or approved equal.

INSTALLATION
Telephone cable shall be installed in conduit as indicated in the plans and specifications. Cable shall be inspected for damage prior to installation. Cable shall be run splice-free from origin to termination. Cable shall be hand pulled through all conduits.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Telephone cable will be measured for payment per unit foot, installed and in place, after passing any testing that may be required. Testing consists of continuity and high voltage insulation testing. A cable that reads infinite resistance to ground is considered passing. Cables not passing testing shall be replaced at the Contractor's expense.

SPECIFICATIONS FOR ELECTRICAL SERVICE

DESCRIPTION
Electrical service shall include all materials and labor required to construct an electrical service on pole or other structure.

MATERIALS
Materials shall be new and shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. The Contractor shall be responsible for coordinating with the local power company to determine the exact specifications for the service.

INSTALLATION
Installation shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. The Contractor shall be responsible for coordinating with the local utilities as to exact placement of the service.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Electrical service will be measured for payment per unit each. This item includes all electrical inspection and other fees required to provide electrical service. This item includes conduit, meter base, fused cutout, ground rod, wire, connectors, fittings and all associated hardware required to construct the service.

SPECIFICATIONS FOR TELEPHONE LINE SHARING DEVICE

DESCRIPTION
Telephone line sharing device shall consist of an enclosure, fax/modem switch and all associated electrical hardware.

MATERIALS
Enclosure shall be non-metallic with stainless steel hinge and lockable hasp. Enclosure shall be 11" X 9" X 6" minimum. Enclosure shall contain a duplex receptacle, surge protector and fax/modem switch. Surge protector shall be Tripp-Lite Ultrafax or approved equal. Fax/modem switch shall be Multi-Link Stick or approved equal.

INSTALLATION
Installation shall be in accordance with the National Electric Code and National Electric Safety Code. Enclosure shall be installed on service pole with pole mounting bracket. VMS phone line shall connect to voice port. RWIS phone line shall connect to modem port. Wiring shall be neat and orderly. Equipment shall be fastened to enclosure to allow easy replacement.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Telephone line sharing device will be measured for payment per unit each. This item includes all labor, conduit, wiring, connectors, fittings, and Master Lock keyed for #2577 key.

SPECIFICATIONS FOR POLE

DESCRIPTION

Pole shall include all materials and labor required to install a wood pole. Unless otherwise specified wood pole shall be 35'.

MATERIALS

Materials shall be new and in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition.

INSTALLATION

Installation shall be in accordance with the plans and specifications, the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, National Electric Code and National Electric Safety Code. The Contractor shall stake all proposed pole base locations before excavation. Poles located behind guardrail shall have a minimum 4' spacing from edge of pole to face of guardrail, otherwise poles shall be located a minimum of 30' from all driving lanes. The Contractor shall obtain approval of staked locations before excavation. The KYTC Division of Operations, ITS Branch will approve locations for all field devices. The Contractor shall have utilities marked in the field prior to requesting approval. The Contractor shall allow two weeks to schedule this location approval with the Cabinet. KYTC approval of field device location does not relieve the contractor from his responsibility to avoid utilities and repair any damage to buried infrastructure. All materials shall be installed in a neat and professional manner. The Contractor shall grade and re-seed all disturbed areas and restore the area to the satisfaction of the Engineer. Wood poles shall have a butt ground and #4 AWG solid ground wire installed. Ground wire shall extend 1 foot above pole. All metal conduit on pole shall be bonded to the ground wire with the proper connectors.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pole will be measured for payment per unit each. Payment shall made after the pole is set and the area is restored to the satisfaction of the Engineer. This item includes furnishing and installing pole butt grounding system. This item includes all labor and equipment required to install pole in rock or difficult soil conditions. This item includes furnishing and installing all hardware, messenger, clamps, guy guards and anchors required to back up service wires or other spans. Unless otherwise approved by the Engineer, anchors shall be installed on all spans.

SPECIFICATIONS FOR TRENCHING AND BACKFILLING

DESCRIPTION
Trenching and backfilling shall include excavation, placement of conduit, backfilling and restoration of disturbed areas.

MATERIALS
No materials are required.

INSTALLATION
Installation shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. The Contractor shall be responsible for locating all underground utilities prior to excavation.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Trenching and backfilling will be measured for payment per unit each. This item includes all electrical inspection and other fees required to provide electrical service. This item includes conduit, meter base, fused cutout, ground rod, wire, connectors, fittings and all associated hardware required to construct the service.

SPECIFICATIONS FOR WIRE

DESCRIPTION
The Contractor shall furnish and install wire in accordance with the plans and specifications.

MATERIALS
Unless otherwise specified wire shall be stranded copper type USE. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION
Installation shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. Wiring shall be neat and orderly. No splices shall be made in wire outside of junction boxes or enclosures. The contractor shall not use excessive force when pulling wire through duct. The contractor shall replace all wire damaged during installation. The Engineer may require testing of wiring for damaged insulation. The Contractor, at his cost, shall replace any wire that does not pass an insulation test of 1 million ohms to ground or more.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Wire will be measured for payment per unit foot, installed and in place, after passing any testing that may be required. This item includes all connectors, splicing and insulating hardware, ties, tape and incidentals required for electrical connections

SPECIFICATIONS FOR CONDUIT

DESCRIPTION
The Contractor shall furnish and install conduit in accordance with the plans and specifications.

MATERIALS
Conduit shall be schedule 40 PVC, rigid steel, or flexible non-metallic conduit as specified. The Contractor shall submit to material testing at the discretion of the Engineer.

INSTALLATION
Installation shall be in accordance with the Kentucky Standard Specifications for Road and Bridge Construction, 2000 edition, the National Electric Code and National Electric Safety Code. All above ground conduit shall be rigid steel. All below ground conduit not under pavement shall be PVC. All below ground conduit under pavement shall be rigid steel. All unused conduits shall be capped to prevent debris from entering. Conduit containing wire or cable shall be sealed with duct seal putty to prevent insects and debris entry.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Conduit will be measured for payment per unit foot, installed and in place. This item includes fittings, connectors, clamps, caps and other materials necessary for proper installation.

SPECIFICATIONS FOR REFERENCE MARKER

DESCRIPTION
Reference Markers shall be placed every 0.1 miles facing both directions of traffic.

MATERIALS
Reference markers are to be fabricated from 2.03 mm aluminum alloy 5052-H38 Sheet ASTM B209, and shall be properly prepared to receive the retroreflective background material according to the manufacture's 5/32 s recommendations. Background material shall be standard blue in color and shall be retroflectorized. Copy is to be silver/white reflectorized, 254.00 Series 7/32 C 9/32 numerals of the cut out, non-removable type. Route marker shall be retroflectorized white cut outs of the distinctive U. S. Shield, omitting the black background of the standard rectangular shapes. Background, copy material, and route markers must meet Type III, Class 7/32 I 9/32 requirements of Section 830 of the Standard Specifications.

INSTALLATION
This item shall include the installation of reference markers on posts or barrier mounting brackets as specified. Barrier mounting bracket shall include furnishing and installing the specified bracket, square steel tubing, and all associated hardware as shown in the plans.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Reference markers will be measured for payment per unit each. This item shall include all labor, traffic control, and materials required for installation.

SPECIFICATIONS FOR BARRIER MOUNTING BRACKET

DESCRIPTION
Barrier mounting bracket shall include all labor and materials required to install bracket on barrier wall.

MATERIALS
Barrier mounting bracket shall be fabricated in accordance with the plans and specifications.

INSTALLATION
Barrier mounting bracket shall be attached to the barrier wall in accordance with the plans and specifications. The Contractor shall submit a sample bracket and mounting hardware to the Engineer for approval.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Barrier mounting bracket will be measured for payment per unit each. This item includes all labor, traffic control, and materials required for installation.

SPECIFICATIONS FOR STEEL POSTS

DESCRIPTION
Reference markers shall be supported by steel posts.

MATERIALS
Posts used for the mounting of reference markers shall be Type II posts conforming to Section 832 of the Standard Specifications.

INSTALLATION
Post shall be attached and sign panel mounted to maintain a 4 foot vertical clearance from elevation of nearest edge of roadway pavement to bottom of sign face. Minimum length of a post shall be 12 feet. All necessary hardware shall be included for attaching reference markers to posts.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT
Steel posts will be measured for payment per unit each. This item includes all labor, traffic control and materials required for installation.

TESTING

The contractor shall notify the Engineer when each device has been fully installed and is functioning in the ARTIMIS system. The contractor shall demonstrate proper functioning of all devices after installation. After passing the functional test, the device shall continue to operate while being used in daily ARTIMIS operations for a period of 30 days. The contractor shall be responsible for repairing any malfunctioning device during the 30 day burn-in period. If a device fails during the burn in period, the burn-in period shall start over and continue for another 30-days. Failure of a device is defined as the replacement of a component necessary to place the device back in operation. POTS communication errors are not considered a failure for the purpose of this test. The Contractor shall demonstrate proper calibration of RWIS sensors after installation and at the end of the 30 day burn-in period.

The project will be accepted after all devices have completed their 30 day test successfully and acceptable as-built drawings have been received.

SPECIAL NOTES FOR UTILITY CLEARANCE IMPACT ON CONSTRUCTION

BOONE COUNTY
CM-STPS 75-7(123)
FD52 008 0075 171-179
THE CINCINNATI LEXINGTON ROAD (I-75)
ARTIMIS Expansion from the Walton Exit to Mount Zion Road
Reference Markers, Overhead Variable Message Signs, Video Cameras,
and Roadway Weather Information System
Item Nos. 6-974.00,6-974.01.

There are no utilities known to require relocation for this project. There may be utilities within the construction limits. Utilities within the project limits shall be identified and protected by the road contractor.

Railroads are not involved in this project.

PROTECTION OF UTILITIES

THE LOCATION OF UTILITIES PROVIDED IN THE CONTRACT DOCUMENTS HAS BEEN FURNISHED BY THE FACILITY OWNERS AND/OR BY REVIEWING RECORD DRAWINGS AND MAY NOT BE ACCURATE. IT WILL BE THE ROADWAY CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITIES BEFORE EXCAVATING BY CALLING THE VARIOUS UTILITY OWNERS AND BY EXAMINING ANY SUPPLEMENTAL INFORMATION SUPPLIED BY THE CABINET. IF NECESSARY, THE ROADWAY CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF UTILITIES BY HAND DIGGING TO EXPOSE UTILITIES BEFORE EXCAVATING IN THE AREA OF A UTILITY. THE COST FOR REPAIR AND ANY OTHER ASSOCIATED COSTS FOR ANY DAMAGE TO UTILITIES CAUSED BY THE ROADWAY CONTRACTOR'S OPERATIONS SHALL BE BORNE BY THE ROADWAY CONTRACTOR.

THE CONTRACTOR IS ADVISED TO CONTACT THE BUD ONE-CALL SYSTEM; HOWEVER, THE CONTRACTOR SHOULD BE AWARE THAT OWNERS OF UNDERGROUND FACILITIES ARE NOT REQUIRED TO BE MEMBERS OF THE BUD ONE-CALL SYSTEM. IT MAY BE NECESSARY FOR THE CONTRACTOR TO CONTACT THE COUNTY COURT CLERK TO DETERMINE WHAT UTILITY COMPANIES HAVE FACILITIES IN THE PROJECT AREA.

PART II

SPECIAL PROVISIONS APPLICABLE TO PROJECT

SPECIAL PROVISION NO.	TITLE

NO SPECIAL PROVISIONS APPLY TO THIS PROJECT

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS
(Copies of Each Attached)

1. Schedule of Minimum Wages Established for the Project.

2. FHWA 1273 (Rev. 3-94) Required Contract Provisions.

3. Employment Requirements Relating to Non-Discrimination of Employees Applicable to Federal Aid System Contracts (12-3-92).

4. Notice of Requirements for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246).

5. Executive Branch Code of Ethics.

TRANSPORTATION CABINET
DIVISION OF CONTRACT PROCUREMENT
COMPLIANCE SECTION

SHEET ONE

PROJECT WAGE RATES **LETTING: 01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

The Cincinnati-Lexington Road (I-75)

Reference Markers, Overhead Variable Message Signs, Video Cameras and Roadway Weather Information System

CRAFTS	BASIC HOURLY RATES	HIGHWAY FRINGE BENEFIT PAYMENTS COMBINED
Bricklayers	22.96	7.39
Boone, Campbell, Kenton and Pendleton Counties:		
Carpenters and Piledrivermen	22.42	4.73
Divers	33.63	4.73
Millwrights	21.90	7.92
Cement Masons	21.03	6.00
Electricians	23.53	7.20
Sound Communications:		
Installer	18.00	3.475
Cable Puller	9.00	2.64
Ironworkers:		
Reinforcing: Up to and including 30- mile radius of Hamilton County, Ohio Courthouse	22.71	10.47
Beyond 30- mile radius of Hamilton County, Ohio Courthouse	22.96	10.47
Structural	23.45	10.88
Fence Erector	21.11	10.88
Painters:		
Elevated Tanks	22.05	4.70
(Heavy and Highway Bridges-Guardrails-Lightpoles-Striping):		
Bridge/Equipment Tender and/or Containment Builder	18.74	4.70
Brush and Roller	21.05	4.70
Spray	21.55	4.70
Sandblasting and Hopper Tender; Water Blasting	21.80	4.70
Bridges when highest point of Clearance is 60 feet or more; & Lead Abatement Projects	22.05	4.70
Sandblasting, Hopper Tender, Waterblasting (Bridges when highest point of Clearance is 60 feet or more	22.80	4.70
Plumbers	25.50	7.53

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

TRANSPORTATION CABINET
DIVISION OF CONTRACT PROCUREMENT
COMPLIANCE SECTION

PROJECT WAGE RATES **SHEET TWO** **01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

LABORERS:
Pendleton County:
Aging and curing of concrete, asbestos abatement worker, asphalt plant, asphalt, batch truck dump, carpenter tender, cement mason tender, cleaning of machines, concrete, demolition, dredging, drill tender, environmental -- nuclear, radiation, toxic and hazardous waste - level D, flagperson, grade checker, hand digging and hand back filling, highway marker placer, landscaping, mesh handler and placer, puddler, railroad, rip-rap and grouter, right-of-way, sign, guardrail and fence installer, signal person, sound barrier installer, storm and sanitary sewer, swamper, truck spotter and dumper and wrecking of concrete form.

BASE RATE.....16.34
FRINGE BENEFITS..... 7.38

Batter board man (sanitary and storm sewer), brickmason tender, mortar mixer operator, burner and welder, bushammer, chain saw operator, concrete saw operator, deckhand scow man, dry cement handler, environmental - nuclear, radiation, toxic and hazardous waste - level C, forklift operator for masonary, form setter, green concrete cutting, hand operated grouter and grinder machine operator, jackhammer, pavement breaker, paving joint machine, pipelayer, plastic pipe fusion, power driven Georgia buggy and wheel barrow, power post hole digger, precast manhole setter, walk-behind tamper, walk-behind trencher, sand blaster, concrete chipper, surface grinder, vibrator operator and wagon driller.

BASE RATE.....16.59
FRINGE BENEFITS..... 7.38

Air track driller, asphalt luteman and raker, gunnite nozzleman, gunnite operator and mixer, grout pump operator, powderman and blaster, side rail setter, rail paved ditch, screw operator, tunnel (free air) and water blaster.

BASE RATE.....16.64
FRINGE BENEFITS..... 7.38

Caisson worker (free air), cement finisher, environmental - nuclear, radiation, toxic and hazardous waste - levels A and B, miner and driller (free air), tunnel blaster and tunnel mucker (free air).

BASE RATE.....17.24
FRINGE BENEFITS..... 7.38

TRANSPORTATION CABINET
DIVISION OF CONTRACT PROCUREMENT
COMPLIANCE SECTION

PROJECT WAGE RATES **SHEET THREE 01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

LABORERS: (continued)
Boone, Campbell and Kenton Counties:
Asphalt laborer, carpenter tender, concrete curing applicator, dump man (batch truck), guardrail and fence installer, joint setter, laborer (construction), landscape laborer, mesh handlers and placer, right-of-way laborer, riprap laborer and grouter, scaffold erector, seal coating, surface treatment or road mix laborer, sign installer, slurry seal, utility man, bridgeman, handyman, waterproofing laborer, flagperson, hazardous waste (level D), diver tender, zone person & traffic control.

BASE RATE.....21.32
FRINGE BENEFITS..... 4.45

Skidsteer, asphalt raker, concrete puddler, kettle man (pipeline), machine driven tools (gas, electric, air), mason tender, brick paver, mortar mixer, power buggy or power wheelbarrow, sheeting & shoring man, surface grinder man, plastic fusing machine operator, pug mill operator, & vacuum devices (wet or dry), rodding machine operator, diver, screw man or paver, screed person, water blast, hand held wand, pumps 4" and under (gas, air or electric), hazardous waste (level C), air track and wagon drill, bottom person, cofferdam (below 25 ft. deep), concrete saw person, cutting with burning torch, form setter, hand spiker (railroad), pipelayer, tunnel laborer (without air) & caisson, underground person (working in sewer and waterline, cleaning, repairing and reconditioning), sandblaster nozzleperson and hazardous waste (level B).

BASE RATE.....21.49
FRINGE BENEFITS..... 4.45

Blaster, mucker, powder person, top lander, wrencher (mechanical joints and utility pipeline), yarner, hazardous waste (level A), concrete specialist, concrete crew in tunnels (with air pressurized $1.00 premium), curb setter & cutter, grade checker, utility pipeline tapper, waterline, and caulker.

BASE RATE.....21.82
FRINGE BENEFITS..... 4.45

Miner (with air pressurized $1.00 premium), and gunnite nozzle person.

BASE RATE.....22.27
FRINGE BENEFITS..... 4.45

Signal person will receive the rate equal to the rate paid the labor classification for which he or she is signaling.

TRANSPORTATION CABINET
DIVISION OF CONTRACT PROCUREMENT
COMPLIANCE SECTION

PROJECT WAGE RATES **SHEET FOUR** **01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

TEAMSTERS:
Drivers

BASE RATE.....15.85
FRINGE BENEFITS..... 4.60

Euclid wagon, end dump, low-boy, heavy duty equipment, tractor-trailer combination & drag.

BASE RATE.....16.29
FRINGE BENEFITS..... 4.60

OPERATING ENGINEERS:
Master Mechanic

BASE RATE.....25.59
FRINGE BENEFITS..... 7.10

Air compressor on steel erection, barrier moving machine, boiler operator on compressor or generator when mounted on a rig, cableway, combination concrete mixer and tower, concrete plant (over 4 yd. capacity), concrete pump, crane (including boom truck, cherry picker), derrick, dragline, dredge (dipper, clam, or suction), elevating grader or Euclid loader, floating equipment, gradeall, helicopter crew (operator - hoist or winch), hoe, hoisting engine on shaft or tunnel work, industrial type tractor, jet engine dryer (D8 or D9), diesel tractor, locomotive (standard gauge), mixer, (paving, single or double drum), mucking machine, multiple scraper, piledriving machine, power shovel, prentice loader, Quad 9 (double pusher), refrigerating machine (freezer operation), side boom, slip-form paver, tower derrick, tree shredder, trench machine (over 24" wide), truck mounted concrete pump, tug boat, tunnel machine and/or mining machine, wheel excavator, hydraulic gantry (lifting system), rail tamper (w/auto lifting and aligning device), maintenance operator class A, rough terrain fork lift with winch/hoist.

BASE RATE..... 25.34
FRINGE BENEFITS 7.10

Asphalt paver, automatic subgrade machine (self-propelled CMI type), Bobcat type and/or skid steer loader with hoe attachment greater than 7,000 lbs., boring machine more than 48", bulldozer, endloader, Kolman-type loader (production type-dirt), lead grease man, power grader, power scraper, push cat, trench machines (24" wide and under), concrete grinder/planer, pettibone-rail equipment, vermeer type concrete saw, hydro milling machine, lighting & traffic signal installation equipment, material transfer equipment (shuttle buggy) asphalt.

BASE RATE.....25.22
FRINGE BENEFITS..... 7.10

PROJECT WAGE RATES **SHEET FIVE** **01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

OPERATING ENGINEERS: (continued)
A-Frame, air compressor on tunnel work (low pressure), asphalt plant engineer, locomotive (narrow gauge), mixer, concrete (more than one bag cap.), mixer one bag capacity (side loader), power boiler over 15 lb. pressure, pump operator installing and operating well points, pump (4" and over discharge), roller-asphalt, utility operator (small equipment), welding machine, bobcat type and/or skid steer loader, switch and tie tamper (w/o lifting & aligning device), highway drills, railroad tie inserter/remover, Rotovator (lime-soil stabilizer).

BASE RATE.....24.18
FRINGE BENEFITS..... 7.10

Backfiller, bar & joint installing machines, batch plant, bull floats, burlap and curing machine, concrete plant (capacity 4 yd. and under), concrete saw (multiple), conveyor (highway), crusher, deckhand, farm type tractors with attachments (highway except masonry), finishing machine, fireperson, floating equipment, fork lift (highway), form trencher, hydro seeder, plant mixer, post driver, post hole digger (power auger), road widening trencher, roller (brick, grade, macadam), self-propelled power spreader, self-propelled subgrader, steam fireperson, tractor (pulling sheepfoot roller or grader), boring machine operator (48" or less), hydro hammer, pavement breaker, ballast relocator, power brush burner, power form handling equipment, vibratory compactor with integral power.

BASE RATE.....23.00
FRINGE BENEFITS..... 7.10

Compressor (portable, sewer, heavy & highway), drum fireperson (in asphalt plant), generator, oiler, inboard-outboard motorboat-launch, oil heater (asphalt plant), power driven heater, pump (under 4" discharge), signalperson, tire repairperson, masonry fork lift, power sweeper, power scrubber, VAC/ALLS.

BASE RATE 17.84
FRINGE BENEFITS..... 7.10

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

These rates are listed pursuant to Kentucky Determination No. CR-01-IV HWY dated October 8,2001 and/or Federal Decision No. KY 020028 dated March 1, 2002, modification #1 dated April 5, 2002, modification # 2 dated May 3, 2002, modification #3 dated June 21, 2002, modification #4 dated July 5, 2002, modification #5 dated August 16, 2002 and modification #6 dated September 13, 2002.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices.

TRANSPORTATION CABINET
DIVISION OF CONTRACT PROCUREMENT
COMPLIANCE SECTION

PROJECT WAGE RATES **SHEET SIX** **01-17-2003**

BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Rick Stansel, Director
Division of Contract Procurement
Frankfort, Kentucky 40622

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

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ATTACHMENTS

A. Employment Preference for Appalachian Contracts (included in Appalachian contracts only)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contrac-

tual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to

their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-thejob training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determi-

nation") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not regis-

tered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be

necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. **Instructions for Certification - Primary Covered Transactions:**

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that

the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

EMPLOYMENT REQUIREMENTS RELATING TO NONDISCRIMINATION OF EMPLOYEES (APPLICABLE TO FEDERAL-AID SYSTEM CONTRACTS)

AN ACT OF THE KENTUCKY GENERAL ASSEMBLY TO PREVENT DISCRIMINATION IN EMPLOYMENT
KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age (between forty and seventy). The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, disability or age (between forty and seventy), except that such notice or advertisement may indicate a preference, limitation, or specification based on religion, or national origin when religion, or national origin is a bona fide occupational qualification for employment.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual because of his race, color, religion, national origin, sex, disability or age (between forty and seventy), in admission to, or employment in any program established to provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administrating agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

REVISED: 12-3-92

PROJECT: **BOONE COUNTY, CM 3002 (104), FD52 008 0075 171-179**
LETTING: **01-17-2003**

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

TIMETABLE	GOALS FOR MINORITY PARTICIPATION IN EACH TRADE	GOALS FOR FEMALE PARTICIPATION IN EACH TRADE
	11.0%	6.9

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4, 3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed. The notification shall be mailed to:

Carol Gaudin, Regional Director
Office of Federal Contract Compliance Programs
61 Forsyth Street, SW, Suite 7B75
Atlanta, Georgia 30303-8609
(404) 562-2424

4. As used in this Notice, and in the contract resulting from this solicitation, the **"covered area"** is Boone County.

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (6) provides:

No present or former public servant shall, within six (6) months of following termination of his office or employment, accept employment, compensation or other economic benefit from any person or business that contracts or does business with the state in matters in which he was directly involved during his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved in state government. This subsection shall not prohibit the performance of ministerial functions, including, but not limited to, filing tax returns, filing applications for permits or licenses, or filing incorporation papers.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, for a period of one (1) year after the latter of:
a) The date of leaving office or termination of employment; or
b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

PART IV

INSURANCE

The Contractor shall carry the following insurance in addition to the insurance required by law:

(1) Contractor's Public Liability Insurance not less than $100,000.00 for damages arising out of bodily injuries to or death to one person. Not less than $300,000.00for damages arising out of bodily injuries to or death to two or more persons.

(2) Contractor's Property Damages Liability Insurance. Not less than $100,000.00 for all damages arising out of injury or destruction of property in any one accident. Not less than $300,000.00 for all damages during the policy period.

(3) Contractor's Protective Public Liability and Property Damage Insurance. The contractor shall furnish evidence with respect to operations performed for him by subcontractors that he carries in his own behalf for the above stipulated amounts.

(4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:

a. "policy contains no deductible clauses."

b. "policy contains a _____ deductible property
(amount)
damage clause but company will pay claim and collect the deductible from the insured."

(5) WORKMEN'S COMPENSATION INSURANCE. The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

PART V

STATEMENT OF INCOMPLETED WORK

1. Status of Active Prime Contracts. Attached

1. STATUS OF ALL INCOMPLETED PRIME CONTRACTS

All active prime contracts must be reported. This includes prime contracts with public and private owners and joint-ventured contracts. The names of the joint venturers must be shown when reporting these projects. A machine or typed listing reporting the status of each contract is acceptable when attached to this report; however, the total amounts on the itemized listing must be reported in the space provided below:

CONTRACT WITH	PROJECT IDENTIFICATION	PRIME CONTRACT AMOUNT	EARNINGS THROUGH LAST APPROVED ESTIMATE	TOTAL AMOUNT OF WORK REMAINING
TOTAL (Attach Summary if not itemized above)		$	$	$

PART VI

BID ITEMS

THE QUANTITY SHEET(S) REPRESENTS THE ESTIMATED QUANTITIES (ONLY) FOR THE SUBJECT PROJECT. PROPOSAL(S) MAY NOT BE AVAILABLE WHEN THE QUANTITIES ARE POSTED.
YOUR BID **WILL NOT** BE CONSIDERED IF THESE SHEET(S) ARE MADE A PART OF THE BID PROPOSAL WHICH YOU SUBMIT TO THE KENTUCKY DEPARTMENT OF HIGHWAYS.

TRANSPORTATION CABINET
Department of Highways
FRANKFORT, KY 40622

Sheet No: 1
PCN: 03-0001
Letting: 1/17/2003

BOONE COUNTY
CM 3002 (104)

Item No.	Code No.	Item	Approximate Quantity	Unit	Unit Price Dollars	Amount Dollars
1	2187	SITE PREPARATION	**2.00**	EACH		
2	2650	MAINTAIN AND CONTROL TRAFFIC	**1.00**	LP SUM		
3	4740	POLE BASE	**2.00**	EACH		
4	4791	CONDUIT-3/4 INCH	**694.00**	LIN FT		
5	4795	CONDUIT-2 INCH	**734.00**	LIN FT		
6	4810	JUNCTION BOX	**3.00**	EACH		
7	4820	TRENCHING AND BACKFILLING	**655.00**	LIN FT		
8	4832	WIRE-NO. 12	**500.00**	LIN FT		
9	4833	WIRE-NO. 8	**1,100.00**	LIN FT		
10	4836	WIRE-NO. 2	**1,125.00**	LIN FT		
11	4871	POLE-35 FT WOODEN	**1.00**	EACH		
12	4899	ELECTRICAL SERVICE	**2.00**	EA		
13	4901	TELEPHONE SERVICE	**2.00**	EA		
14	4903	REFERENCE MARKER	**160.00**	EA		
15	4904	BARRIER MOUNTING BRACKET	**80.00**	EA		
16	6411	STEEL POST TYPE 2	**440.00**	LIN FT		
17	6490	CLASS A CONCRETE FOR SIGNS	**64.00**	CU YD		
18	6491	STEEL REINFORCEMENT FOR SIGNS	**4,727.00**	LB		
19	7303	ROADWAY CROSS SECTION	**2.00**	EACH		
20	9706	OSS 100' GALV STEEL (VMS)	**2.00**	EACH		
21	9683	REM & REPLACE MED BARR	**2.00**	EACH		
22	9684	POLE 50' W/LOWERING DEVICE	**2.00**	EACH		

THE QUANTITY SHEET(S) REPRESENTS THE ESTIMATED QUANTITIES (ONLY) FOR THE SUBJECT PROJECT. PROPOSAL(S) MAY NOT BE AVAILABLE WHEN THE QUANTITIES ARE POSTED.
YOUR BID **WILL NOT** BE CONSIDERED IF THESE SHEET(S) ARE MADE A PART OF THE BID PROPOSAL WHICH YOU SUBMIT TO THE KENTUCKY DEPARTMENT OF HIGHWAYS.

TRANSPORTATION CABINET
Department of Highways
FRANKFORT, KY 40622

Sheet No: 2
PCN: 03-0001
Letting: 1/17/2003

BOONE COUNTY
CM 3002 (104)

Item No.	Code No.	Item	Approximate Quantity	Unit	Unit Price Dollars	Amount Dollars
23	9652	WINCH LOWERING TOOL	**1.00**	EACH		
24	9653	CAMERA INTERFACE BOX	**2.00**	EACH		
25	9654	CCTV ASSEMBLY	**2.00**	EACH		
26	9655	CCTV KEYBOARD CONTROLLER	**1.00**	EACH		
27	9656	VIDEO TRANSMISSION SYSTEM	**2.00**	EACH		
28	9657	CCTV CONTROL CABLE (1000FT)	**1.00**	EACH		
29	9658	RWIS TOWER	**1.00**	EACH		
30	9659	RWIS EQUIPMENT	**1.00**	EACH		
31	9662	DYNAMIC MESSAGE SIGN 3X24	**2.00**	EACH		
32	9685	ENCLOSURE MODEL 334	**2.00**	EACH		
33	9648	TELEPHONE CABLE	**1,100.00**	LIN FT		
34	9686	PHONE LINE SHARING DEVICE	**1.00**	EACH		
35	2569	DEMOBILIZATION	**1.00**	LP SUM		
36		**TOTAL BID**				$.

PART VII

CERTIFICATIONS

1.	Provisions Relative to Senate Bill 258 (1994)	Attached
2.	Certification for Federal-Aid Contract	Attached
3.	Certification	Attached
4.	Non-Collusion Certification	Attached
5.	Certification with regard to the Performance of Previous Contracts or Subcontracts	Attached
6.	Certification of Bid Proposal	Attached

PROVISIONS RELATIVE TO SENATE BILL 258 (1994)

During the performance of the contract, the contractor agrees to comply with applicable provisions of:

1.	KRS 136	Corporation and Utility Taxes
2.	KRS 139	Sale and Use Taxes
3.	KRS 141	Income Taxes
4.	KRS 337	Wages and Hours
5.	KRS 338	Occupational Safety and Health of Employees
6.	KRS 341	Unemployment Compensation
7.	KRS 342	Workers Compensation

Any final determinations of a violation by the contractor within the previous five (5) years pursuant to the applicable statutes above are revealed as follows:

_____

_____

_____

_____

_____

_____

_____

_____

CERTIFICATION FOR FEDERAL-AID CONTRACT

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agent.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is a material representation of fact which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

_____

(Insert name of Individual, Joint Venture, Co-partnership, or Corporation submitting bid).

_____

(Signature)

_____

(Title)

CERTIFICATION

COMMONWEALTH OF KENTUCKY

COUNTY _____
PROJECT NO. _____

I, _____, _____, under penalty
(President or Authorized Official of Bidder) (Title)

perjury under the laws of the United States, do hereby certify that, except as noted below,

_____
(Insert name of individual, Joint Venture, Co-Partnership or Corporation Submitting Bid)

any person associated therewith in the capacity of (owner, partner, director, officer, principal investigator, project director, manager, auditor, or any position involving the Administration of Federal Funds): is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency; has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years; does not have a proposed debarment pending; and has not been indicted, convicted, or had a civil judgement rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

Please list below any exceptions to the foregoing, to whom it applies, initiating agency and dates of action.

Exceptions: _____

_____

_____ _____
(Signature) (Title)

REVISED: 8-23-89

NON-COLLUSION CERTIFICATION

COMMONWEALTH OF KENTUCKY
COUNTY _____
PROJECT NO. _____

I, _____, _____, under
(Name of officer signing certification) (Title)

penalty of perjury under the laws of the United States, do hereby certify that

_____,
(Insert name of Individual, Joint Venture, Co-partnership, or Corporation submitting bid)

its agent, officers or employees have not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding in connection with this proposal.

_____
(Signature)

_____
(Title)

REVISED: 8-23-89

NON-COLLUSION CERTIFICATION

COMMONWEALTH OF KENTUCKY
COUNTY _____
PROJECT NO. _____

I,_____, _____, under
(Name of officer signing certification) (Title)

penalty or perjury under the laws of the United States, do hereby certify that

_____,(In
sert name of Individual, Joint Venture, Co-partnership, or Corporation submitting bid)

its agent, officers or employees have not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding in connection with this proposal.

_____
(Signature)

_____
(Title)

REVISED: 8-23-89

Certification with regard to the Performance of Previous Contracts or Subcontracts subject to the Equal Opportunity Clause and the filing of Required Reports.

The bidder _____, proposed subcontractor _____, hereby certifies that he has ____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that he has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract

Compliance, a Federal Government contracting or administering agency, or the Former President's

Committee on Equal Employment Opportunity, all reports due under the applicable filing

requirements.

_____
(Company)

By: _____

_____
(Title)

Date: _____

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1)), and must be submitted by bidders and proposed subcontractors only in connection with the contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders of their implementing regulation.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

CERTIFICATION OF BID PROPOSAL

We (I) propose to furnish all labor, equipment and materials necessary to construct and/or improve the subject project in accordance with the plans, the Transportation Cabinet's Standard Specifications for Road and Bridge Construction, current edition, special provisions, notes applicable to the project as indicated herein and all addenda issued on this project subsequent to purchase of proposal.

We (I) attach a bid proposal guaranty as provided in the special provisions in an amount not less than 5% of the total bid. We agree to execute a contract in accordance with this bid proposal within 15 calendar days after the receipt of the notice of award for the project.

We (I) have examined the site of proposed work, project plans, specifications, special provisions, and notes applicable to the project referred to herein. We understand that the quantities shown herein are estimated quantities subject to increase or decrease as provided in the specifications.

"The bidder certifies that it has secured participation by Disadvantaged Business Enterprises ("DBE") in the amount of ____ percent of the total value of this contract and that the DBE participation is in compliance with the requirements of 49 CFR 26 and the policies of the Kentucky Transportation Cabinet pertaining to the DBE Program."

_____
Name of Contracting Firm

BY: _____
Authorized Agent Title

_____
Address City State Zip Code

_____
Telephone Number

When two or more organizations bid as a joint venture, enter names of each organization and an authorized agent for each organization must sign above.